HITACHI

SERVICE MANUAL

TK No. 1523E

VK-C800(U·C)·E

Technical Information

VK−C800 (U. C.)

VK−C800E

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

April 1981 TOKAI WORKS

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Chapter 1 Pickup System

1-1. Outline of frequency separation system

The frequency separation system is a pickup system which multiplexes luminance data and 3 primary color data on a space frequence basis by means of the color stripe filter in the camera tube and electron beam scanning.

There are 2 multiplex systems - 1) single carrier frequency separation and 2) double carrier frequency separation. The difference between these 2 system is in the color stripe composition and the color separation circuit system; both of them obtain a non-modulated signal component corresponding to the luminance data and a modulated component corresponding to the color data.

The 2 primary colors are obtained from the modulated component and the other primary color is separated from the non-modulated component by circuitry. The color separation method differs depending on whether there is one or two carrier wave frequencies in the modulated component.

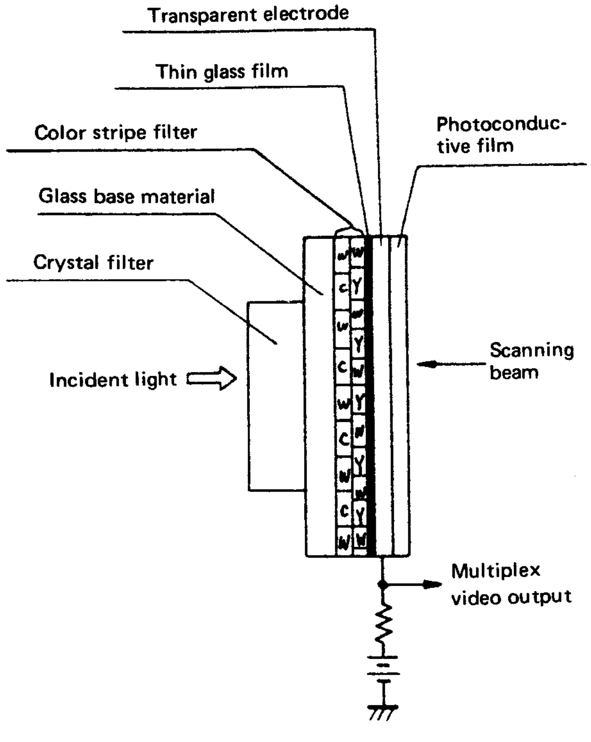


Fig. 1-1 Target construction of frequency separation system

Fig. 1-1 shows the camera tube target construction in the usual frequency separation method. The incident light from the lens passes through the crystal filter first; this is to give picture space frequence characteristics near to the pitch of the color stripe filter and to limit the optical high frequencies.

The color stripe is composed of 2 pairs of the stripes provided with repeated transparent sections and complementary colors section: these are superimposed on each other and form the color filter.

The photoelectric conversion section is made as shown below:

A stripe filter is placed on the glass base; a glass layer is put over it to make it flat; the transparent electrode is placed over it and the photoconductive film is evaporated over it.

In the frequency separation system, the transparent electrode is not divided into stripes, differing from other systems, so the target electrode can be manufactured easily.

The defects are: 2 primary colors are obtained from the modulated component; the other from the non-modulated component, so color unevenness is likely to occur according to unbalanced modulation and the characteristics of the camera tube, and false signals inherent to this system occur, so additional circuitry is required to eliminate these false signals, etc.

1-2. Mechanism of frequency multiplexing

Fig. 1-2 shows an example of the stripe filter which is composed of 2 types of color stripes.

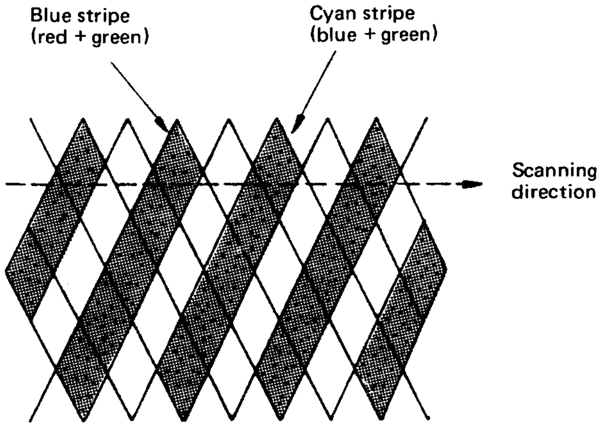


Fig. 1-2 Composition of stripe filter

Now, consider the case when a white object is being shot. First, describing only on the cyan stripe filter (blue + green), the modulated output signal is as shown in Fig. 1-3a.

That is, in the transparent section, none of R, G, B is reflected but passes through the filter, but in the cyan section, red is reflected so the output waveform is as shown in Fig. 1-3b. The ideal waveform should be square, but higher harmonics are limited by the diameter of the electronic beam and the frequency response of the amplifier, so taking only the basic wave in this way is sufficient.

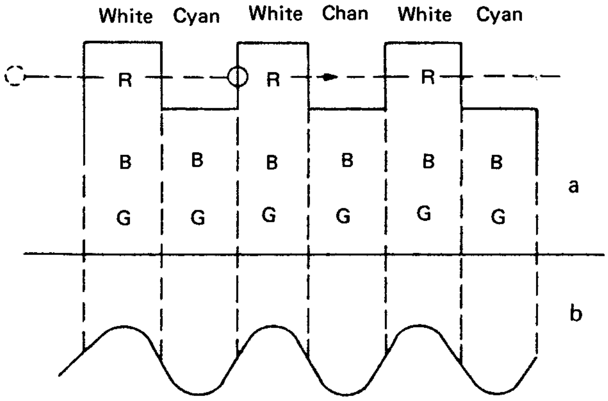


Fig. 1-3 Modulated output signal

For the "blue"output, by replacing this filter to "yellow", blue can be obtained in the modulated form in entirely the same way. Thus, the signal (high frequency) modulated by red and blue, and non-modulated component (low frequency) of the luminance signal can be obtained from the target in multiplexed form.

This modulated frequency is determined by the filter pitch, effective horizontal scanning width and the effective horizontal scanning period of the camera tube.

$$f = \frac{W\ (\mathrm{mm})}{P\ (\mu m) \times T\ (\mu s)} \times 10^3\ (\mathrm{MHz})$$

f : Basic repetition frequency
P : Unit pitch of filter stripes (μm)
W : Effective horizontal scanning width of camera tube (mm)
T : Effective hosizontal acanning period of camera tube (μs)

In general, in the multiplex system which uses a stripe filter, the pattern of the object is fine (space frequency is high) as described previously, and when it draws nearer to the space frequency which is determined by the filter pitch, interference beats occur, and false signals with color sections without color originally are generated.

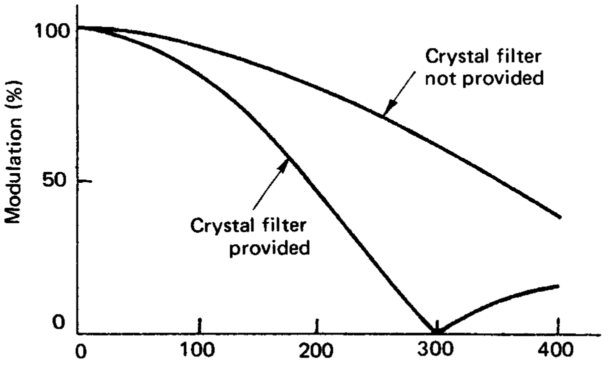


Fig. 1-4 Overall modulation characteristic

The sharply rising edge is provided with the high frequency component, this also causes a false signal.

Fig. 1-4 shows the overall modulation characteristics including the crystal filter; the crystal plate is inserted to the input light path and the high frequency of the space frequency is shut off using the null point of its double refraction characteristics.

1-3 Priciple of single carrier wave frequency separation system

The principle is the same as the general frequency separation system described in 1-1 and 1-2.

The 2 carrier wave system (one of 2 frequency separation systems) has the signal processing circuit simpler than that of the single carrier wave system (called 1 frequency system hereafter).

However, it is inferior because interference beats occur between 2 carrier wave frequencies and that S/N of the high frequency modulated component is likely to be degraded, etc.

On the contrary, the 1 frequency system requires a compensation circuit in addition to the basic circuit, and so the circuit is larger. However, its good feature is that it modulates red and blue using low frequency, so S/N is high and then separated into the red and blue signals as shown in the 2 frequency system. The VK-C800 uses this 1 frequency system. The color separation system is described in the following. Fig. 1-5 shows the color separation circuit block diagram, and Fig. 1-6, the color separation operation principle diagram.

In the 1 frequency system, the pitch of the stripe filter is the same for the cyan (red reflected), yellow (blue reflected) and transparent filters. The red output and the yellow output are modulated waves with the same frequency; in SATICON this is 3.6 MHz.

This multiplex modulated signal is passed through a BPF and then separated into the red and blue signals as shown in Fig. 1-5. It is impossible to separate these signals by ordinary measures because they are of the same frequency, but the designated color signal can be separated to the designated channel using relative position correlation between the angle of the color stripe filter and the scanning beam.

That is, it is made possible by the "Vertical correlation" principle which processes assuming that the signal appearing on the adjacent scanning line is provided with approximately the same color information.

The operation principle is described in the following.

In Fig. 1-6, the cyan and transparent stripe filter (left), and the yellow and transparent filters (right) are of the same pitch, and the angles to vertical are symmetrical to the left and right (± 23.1°).

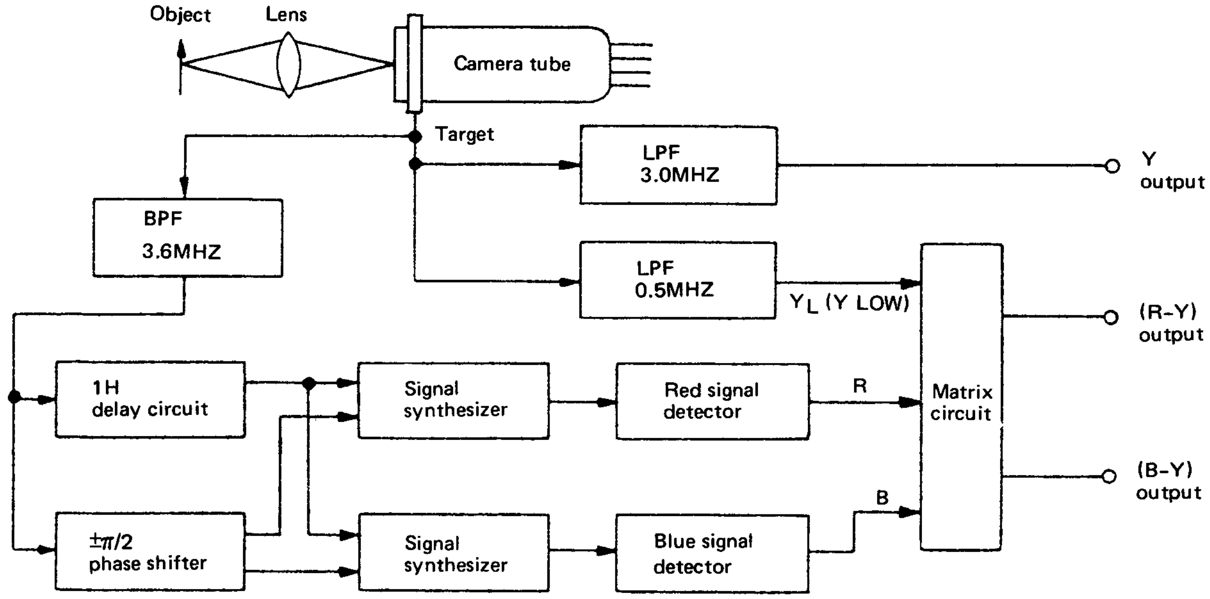

Object
Lens
Camera tube
Target
LPF 3.0MHZ
Y output
BPF 3.6MHZ
LPF 0.5MHZ
Y_L (Y LOW)
Matrix circuit
(R-Y) output
1H delay circuit
Signal synthesizer
Red signal detector
R
(B-Y) output
B
±π/2 phase shifter
Signal synthesizer
Blue signal detector

Fig. 1-5 Color separation circuit block diagram

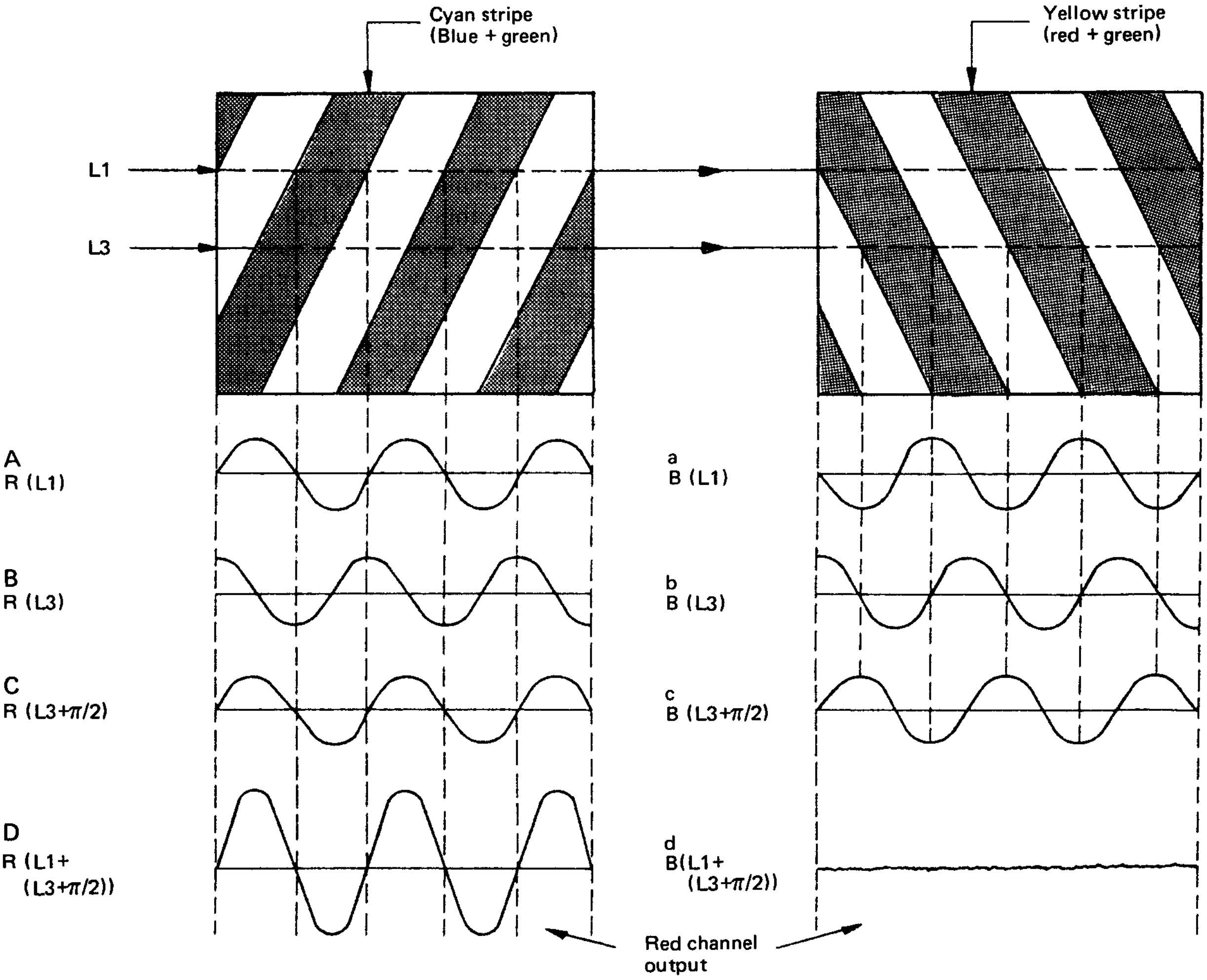

Cyan stripe (Blue + green)
Yellow stripe (red + green)
L1
L3
A R (L1)
B R (L3)
C R (L3+π/2)
D R (L1+ (L3+π/2))
a B (L1)
b B (L3)
c B (L3+π/2)
d B(L1+ (L3+π/2))
Red channel output

Fig. 1-6 Color separation operation principle diagram

Assuming 2 adjacent lines in one field as L1 and L3, signals obtained by the line scanning of L1 and L3 are A and B respectively and B has phase-shift of 90° with respect to A, in the case of the cyan filter.
In the case of the yellow filter, b has phase-shift of 90° with respect to a. However, the angle of the stripe is in reverse to that of the cyan filter, so the direction of the phase-shift is also in reverse to that of the cyan filter. The stripe filters are divided in the diagram from the viewpoint of description, but A and a, B and b are present at the same times.

The multiplexed color information signals obtained from the target shown in Fig. 1-5 pass the BPF with the central frequency 3.6MHz, frequency bandwidth 0.5MHz.
Next, these signals are distributed; one signal passes through the 1 line scanning (1H) delay line, and another is phase-shifted by ± 90° (± $\pi/2$), and then both signals are applied to the signal synthesizer, and separated to produce the color signals.

The operation mentioned above can easily be understood from the waveforms C and D, and c and d in Fig. 1-6. The figure shows the case of the red signal channel, so the blue signal component is cancelled.
In the case of the blue signal channel, the phase shift direction is set to -90° ($-\pi/2$) and the red component is cancelled.
The signals separated in this way are still modulated waves, so by applying them to the detector, they restore the video signal waveforms corresponding to the original red and blue.
The signal processing described above is shown by the following formulae.
The signal obtained from the target shown in Fig. 1-5 can be separated to red and blue through the following.

$$E(N) = EY + EC(N) \tag{1}$$

$$EY = EG + ER/2 + EB/2 \tag{2}$$

$$\begin{aligned} EC(N) &= m\,(ER \sin \omega t + EB \sin \omega t) \\ &= m\,(ER + EB) \sin \omega t \end{aligned} \tag{3}$$

$$EC(N{+}1) = m(ER \sin (\omega t - \pi/2) + EB \sin (\omega t + \pi/2). \tag{4}$$

Where
E(N) : Nth line component inside the basic wave component of multiplex signal
EY : Non-modulated low frequency
EC(N) : Multiplex modulation high frequency (chroma) and Nth line component
EC(N + 1) : Same as above, and (N + l)th line component
EG, ER, EB : Electric signals with G. R. B separated
ω : Modulation angle frequency
m : Modulation of camera tube, assumed same with R and B.

Formulae (3) and (4) which are the chroma components of formula (1) pass through BPF (3.6 MHz) and are applied with a phase shift of $\pm\pi/2$ by the phase shifter cirtuit; this is seen in formula (4) as follows:

$$\begin{aligned} EC'(N + 1 + \pi/2) &= m\,(ER \sin \omega t - EB \sin \omega t) \\ &= m\,(ER - EB) \sin \omega t \end{aligned} \tag{5}$$

$$\begin{aligned} EC'(N + 1 - \pi/2) &= m\,(EB \sin \omega t - ER \sin \omega t) \\ &= m\,(EB - ER) \sin \omega t \end{aligned} \tag{6}$$

Formula (3) delays by 1H, so it is present at the same time as formulae (5) and (6), and with vertical correlation added, the following is obtained:

$$\begin{aligned} ER\!: (3) + (5) &= EC\,(N + 1H) + EC'\,(N + 1 + \pi/2) \\ &= 2m\,ER \sin \omega t \end{aligned} \tag{7}$$

$$\begin{aligned} EB\!: (3) + (6) &= EC\,(N + 1H) + EC'\,(N + 1 - \pi/2) \\ &= 2mEB \sin \omega t \end{aligned} \tag{8}$$

Chapter 2 Camera Tube

2-1. Features of SATICON

The SATICON is a photoconductive camera tube which uses a Se(Selenium) - As(Arsenic) - Te(Tellurium) photoconductive film which was developed after joint study by the Nihon Broadcasting Association and HITACHI.
Conventionally, the photoconductive film of a VIDICON was Sb_2S_3 (antimony trisulfide), a solid film evaporated in high vacuum; it has high sensitivity but its defects are that capacitance residual image is conspicuous and dark current is high.
The SATICON was developed to improve these defects of the VIDICON film; it features high modulation, low residual image and even target base, etc,
Especially in the frequency separation system, complementary colors are used for the color filter, gamma 1 is desirable from the viewpoint of color fidelity; color fidelity has been sharply improved by using the SATICON compared with the VIDICON.

Fig. 2-1 shows spectral sensitivity with equivalent energy light sources for the SATICON and VIDICON.
With the SATICON, characteristics are nearer to the sensitivity of the eye than the VIDICON; especially it is not sensitive to infrared rays, and the infrared ray filter which is required for VIDICON is not required.
With the conventional triple electrode VIDICON, ASC (Automatic sensitivity control) can be done using the fact that the photoelectric conversion sensitivity can be done using the target voltage, but the target voltage of SATICON should be set to a constant 50V from the viewpoint of operation. Other control systems such as controlling the aperture of the lens, etc. are necessary for ASC.
In the VK-C800, the system to control the aperture of the zoom lens according to the camera picture signal level is used.

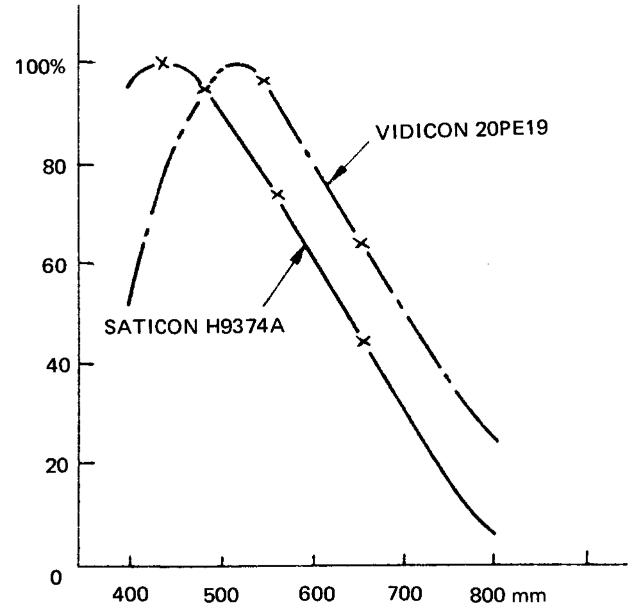


Fig. 2-1 Spectral sensitivity characteristics in equivalent energy light source (Comparison between SATICON and VIDICON)

2-2. Temperature characteristics

It has been known that the SATICON has thermal instability due to non-crystalline Selenium, and especially it irreversible heat breakdown occurs at high temperatures causing a deterioration of sensitivity compared with the VIDICON.

Differing from cameras used for broadcasting, etc. cameras for personal use must be able to be left in a car with its windows tightly closed in the summer sun.

So, a high temperature film is applied to SATICON. Incidentally, a "Cautions on high temperature" label is fixed in an easy-to-see position on the camera body. The accumlated time with the target film at high temperature deteriorates as temperature increases, so the permissible high temperature limit of the SATICON is shown.

Fig. 2-2 shows this accumulated time. Sensitivity deteriorates at high temperatures as described previously, so the permissible value is determined as the point where the sensitivity is reduced by 20%.

For example, when the SATICON is exposed at 75° for 3 hrs, sensitivity deteriorates by 20% and the initial value cannot be restored. Special attention should be paid to this point.

2-3. Thermo-label

Temperature characteristics of the SATICON are determined locally at the film section with no relation to the power ON/OFF operation of the camera.

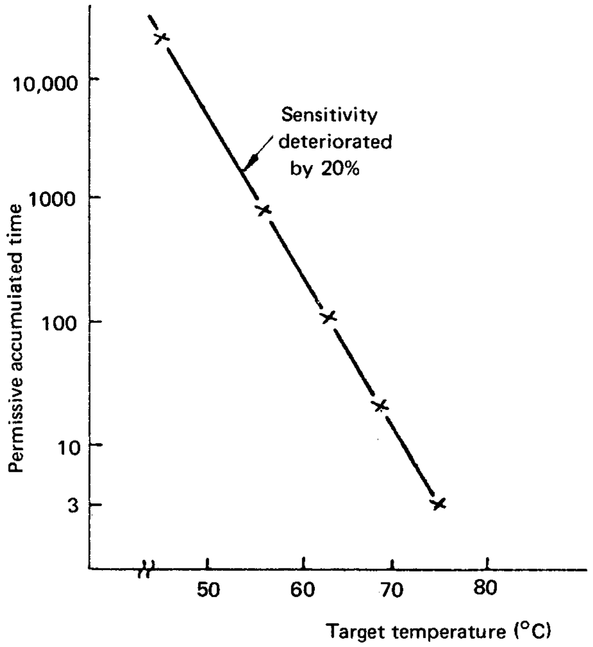


Fig. 2-2 SATICON permissive high temperature accumulated time

However, the temperature rise inside the camera due to heating of the camera itself is approx. 15°C when the camera is operating, so it is required to take this into consideration when the camera is operating.

It is required to handle SATICON after recognizing that the SATICON film is thermally weak.

There is danger that trouble will occur between the user and dealer on this point.

A thermo-label is fixed inside the camera to minimize this kind of trouble.

This thermo-label is fixed to the sync PC Board. It decolors when the temperature exceeds the indicated value "60°C" ±2°C, and the original color cannot be restored once it has become discolored.

This label is light red in general but when the temperature exceeds the indicated value, it turns to dark red. It is completely irreversible, so it can be a proof as to whether or not the user has handled the camera properly.

2-4. Flicker

The low residual image which is one of the SATICON's features is harmed when a fluorescent light is used for illumination; it appears as flicker.

That is, when a VIDICON is used, the residual image is great and flicker is equalized by the residual image and is not seen. It is required to explain this point previously so users understand it. It is also required to use incandescent lamps for illumination when demonstrating the camera.

Chapter 3 Function of Zoom Lens

3-1.. Auto-focus

An auto-focus mechanism (AF) is incorporated in the zoom lens.

3-1-2. Principle of auto-focus

It is required to measure the distance to the object to focus automatically.
In this system, the triangle measurement principle, as in a twin-lens reflex distance meter used in an ordinary camera is used to measure the distamce to the object.

Fig. 3-1 shows the principle. The length of base line B is determined by the camera.
2 mirrors are used; assuming angle θ is obtained by turning one mirror so that the same reflected light as that from the other mirror enters the module properly, distance R to the object is obtained from the following formula.

$\tan\theta = B/R \quad \therefore R = B/\tan\theta$

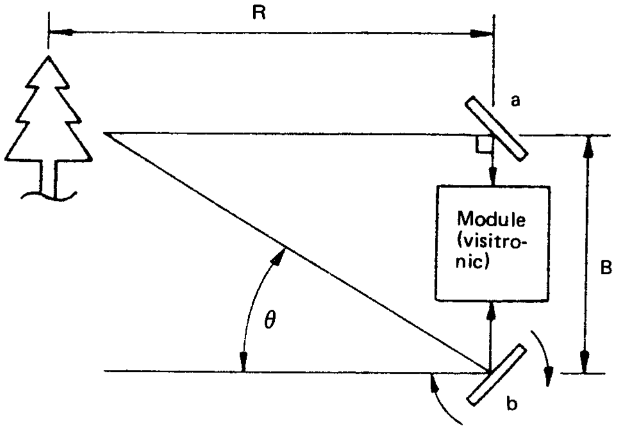

R
a
Module (visitronic)
B
θ
b

Fig. 3-1 Triangle measurement principle

3-1-2. Auto-focus operation

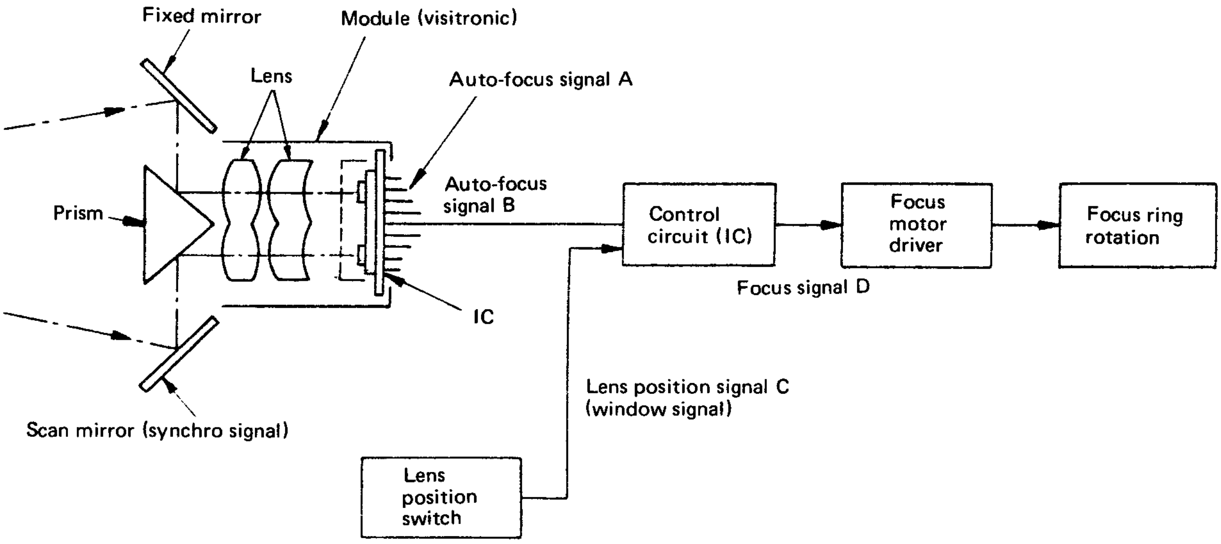

Fixed mirror
Module (visitronic)
Lens
Auto-focus signal A
Auto-focus signal B
Prism
IC
Control circuit (IC)
Focus motor driver
Focus ring rotation
Focus signal D
Lens position signal C (window signal)
Scan mirror (synchro signal)
Lens position switch

Fig.3-2 Auto-focus mechanism block diagram

Fig. 3-2 shows the auto-focus mechanism block diagram.

The scan mirror always performs fine angle oscillation (approx. 5Hz); at some point in one scan, its position matches with light coming via the fixed mirror.
One of the pair of photoelectric conversion sensors is housed in the module, and the sensors detect the same image at this point of agreement.
The correlation signal is generated in the module at that time; the max. point of this signal is equivalent to point R shown in the formula above.

Fig. 3-3 shows the signal relationship in the auto-focus section; what is called the correlation signal A, which produces a peak when the same picture is projected is generated in the module by the reciprocation (very close to∞, ∞ to very close) movement of this scan mirror.

This signal A is converted to auto-focus signal B in the module, and the rise signal obtained last shows the max. value of correlation signal A, and shows that it is focused at this point.

On the other hand, the position detection signal C is produced by the same motive power source as that of the scan mirror, so the present position lens focus is lead to the module, and the signals B and C shown above are processed in an IC; as a result, the relative position, the direction of the lens and error are detected, and the focus signal D is produced. The signal D is applied to the motor in the form of pulses with different positive and negative widths according to the error of lens, as the focus driver.

A pulse D is output every scan cycle, so the focus motor turns faster as the error is greater, and slower as the error is smaller, so smooth auto-adjustment without hunting is achieved. The output is signal D becomes zero when point R of signal B and point P of signal C match (that is, light from the object and oscillation angle of the mirror match, and the focus point of the focus ring matches it), and the focus ring is fixed.

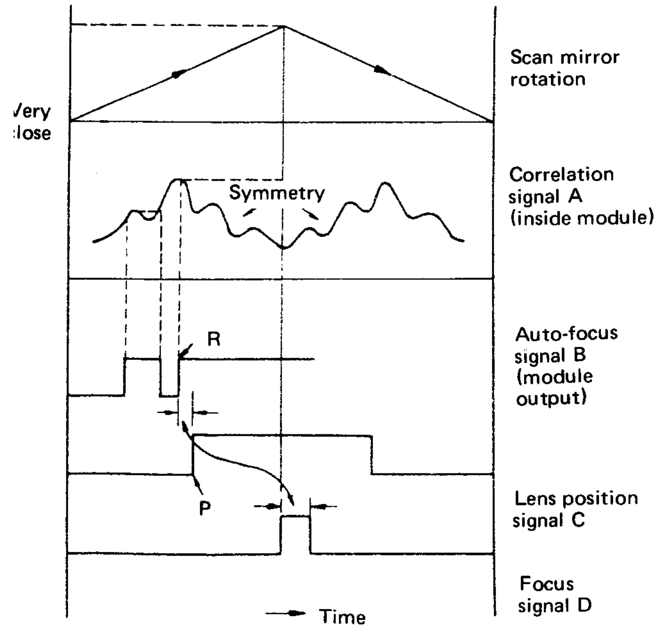


Fig. 3-3 Waveform of signals at each section of auto-focus

Fig. 3.4 is a schematic diagram of this auto-focus; lever A is moved depending on the focus ring rotation, and lever B is moved by the cam interlocked with the scan mirror oscillation. The lens position switch is opened and closed by the operation of these 2 levers, and the focus position of the lens corresponding to the oscillation angle of the scan mirror is detected.

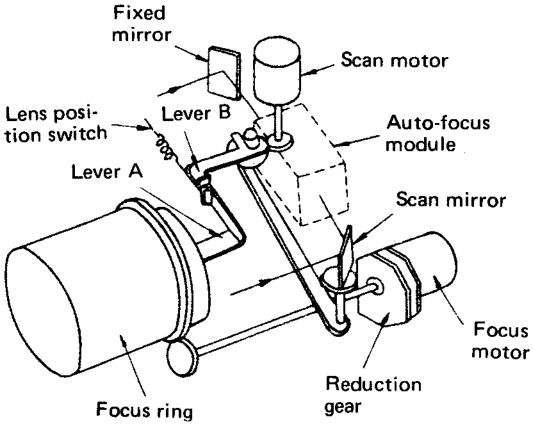


Fig. 3-4 Scematic diagram of auto-focus mechanism

3-2. Auto iris operation

Motor and galvanometer systems are used for driving auto-iris mechanisms; the VK-C800 uses the latter system from the viewpoint of compactness, lightweight and low power consumption.

With the galvanometer system, the movable iron piece is moved by the current applied to the drive coil inside the lens, to open and close the iris.

The brake coil is installed to stabilize and smooth the iris opening/closing operation; the electromotive power according to the iron position and speed is detected and amplified by the brake coil, and from this, negative feedback is applied to the drive circuit.

The auto-iris drive and brake circuits are housed in hybrid IC205.

Fig. 3-5 Shows this circuit diagram.

The variable resistor "AVL" is connected to pin 12 from ICIA inside the IC; the iris is opened in the direction with this A set to (+), and closed in the direction with this A set to (-). The auto-iris operation is: application of the delay signal is forcibly performed by the AUTO-IRIS switch operation using point B of IC1 in reverse to the operation at point A. "Exposure correction" operation is : the operation reference voltage (point A) rises by the closing of the switch, the iris is opened by approx. 1-number. It is designed so that the auto-iris is drawn to the iris "CLOSED" side by a spring when the power of camera is OFF to protect the valuable camera tube from sunlight during transportation, etc.

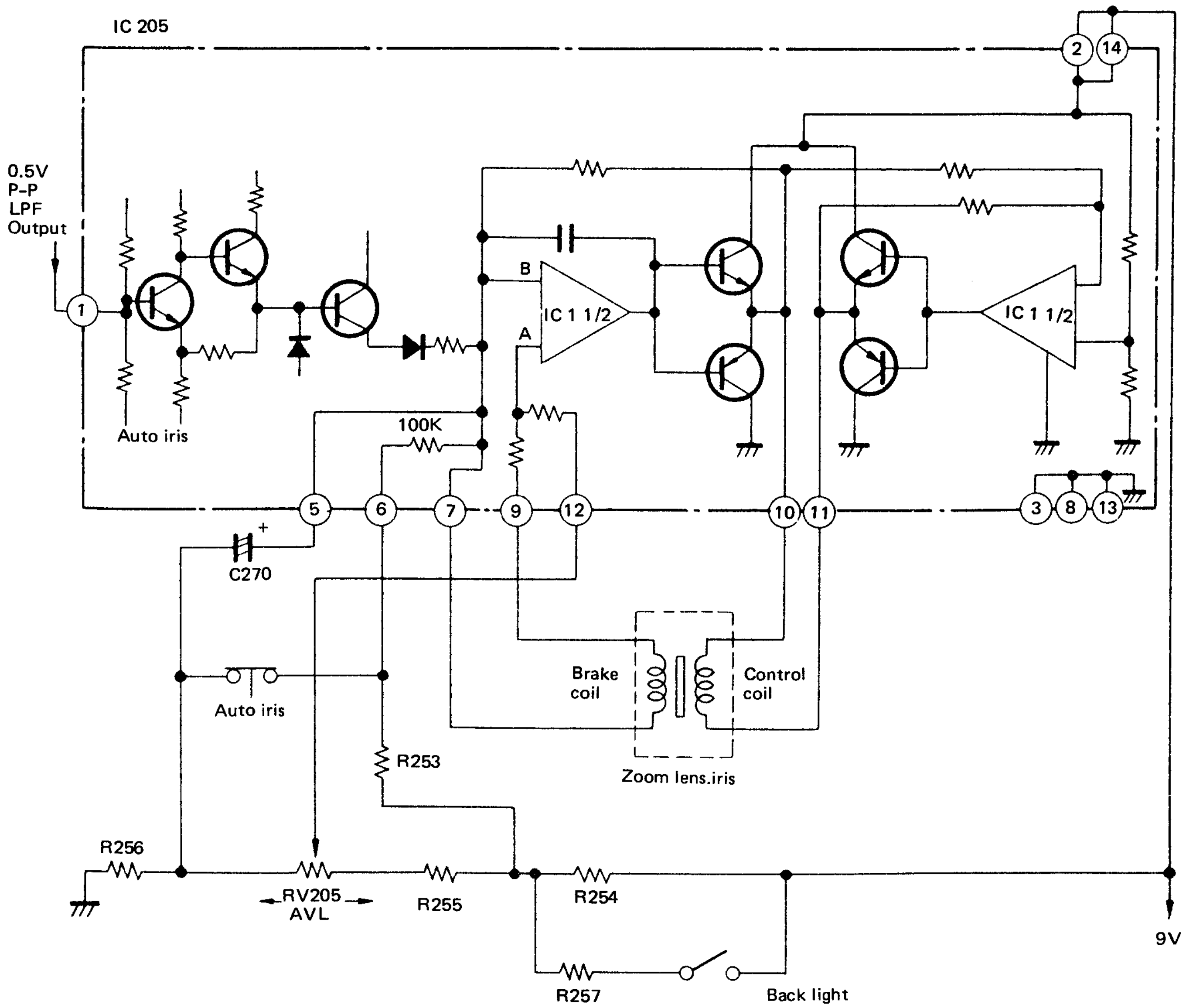

IC 205
0.5V
P-P
LPF
Output
1
Auto iris
B
A
IC 1 1/2
IC 1 1/2
100K
5
6
7
9
12
10
11
3
8
13
2
14
+
C270
Auto iris
Brake coil
Control coil
Zoom lens.iris
R253
R256
RV205
AVL
R255
R254
9V
R257
Back light

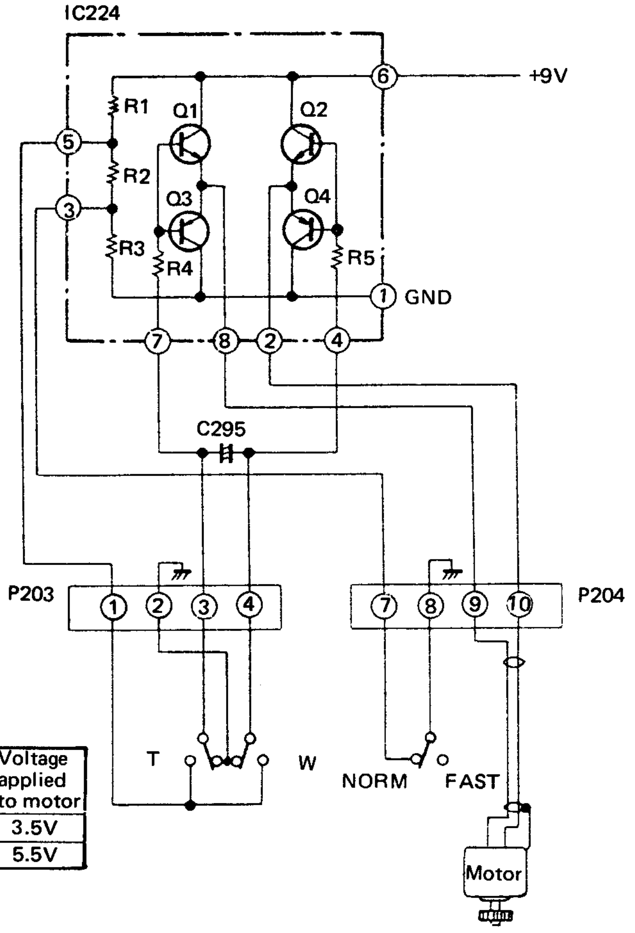
Fig. 3-5 Auto-iris circuit diagram

3-3. Power zoom operation

The motor used for the power drive is assembled into the zoom lens. Remote control between telescopic (TELE) and wide (WIDE) is possible by using the left/right see-saw switch on the grip.

Fig. 3-6 shows the power zoom drive IC224, and the operation switch/zoom motor circuits.
The IC is used to reduce spike noise; it drives the zoom motor with low impedance and at the same time, lessens the TELE/WIDE select switch operation current to reduce switching noise.

A speed select switch is provided as well as the TELE/WIDE select switch: 10sec. is "NORM" operation time and 6 sec., "FAST" operation time. The relation between the voltage applied to the motor is shown in the table.


IC224
+9V
R1
R2
R3
R4
R5
Q1
Q2
Q3
Q4
⑥
⑤
③
① GND
⑦
⑧
②
④
C295
P203
① ② ③ ④
P204
⑦ ⑧ ⑨ ⑩
T
W
NORM
FAST
Motor

	T: TELE (Operation time) W: WIDE	Voltage applied to motor
NORM	10 sec	3.5V
FAST	6 sec	5.5V

Fig. 3-6 Power zoom circuit

3-4. MACRO-mechanism

The zoom lens is variable from 12.5mm(WIDE) to 75mm (TELE).

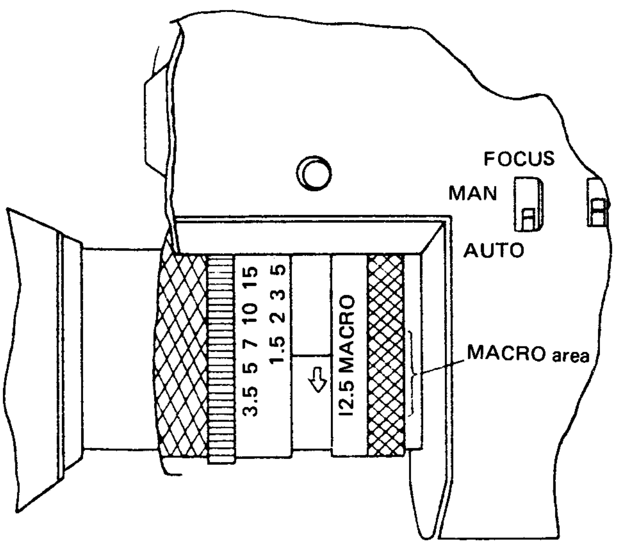

FOCUS
MAN
AUTO
MACRO area
3.5 5 7 10 15
1.5 2 3 5
12.5 MACRO

Fig. 3-7 MACRO indication of zoom lens

As shown in Fig. 3-7, it clicks once at the indication of 12.5 on the WIDE side, and when it is turned continuously, it enters the MACRO area.

MACRO operation, not ordinary zoom operation, is possible on this MACRO area.

described with reference to Fig. 3-8. Assuming that object A is in focus, B, C and D are naturally out of focus.

B, C and D are naturally out of focus.

When zoom lens is turned gradually as it is, the picture angle is not changed but focus moves to B, C, and D in sequence.

MACRO operation only moves focus within a certain picture angle of WIDE 12.5mm as mentioned above; this shows that it is used not only for super closeups but that is possible to provide special effects.

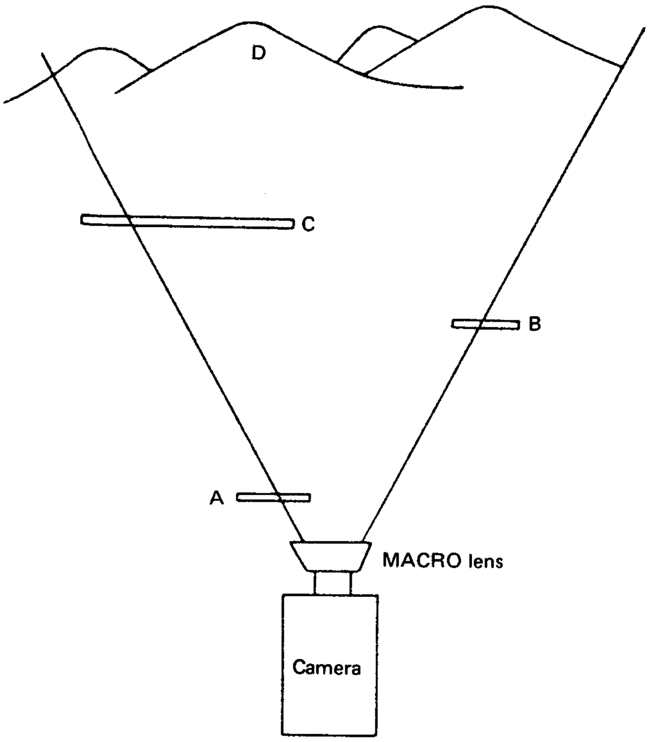


Fig. 3-8 MACRO focus movement diagram

Chapter 4 Operational Functions of Camera

4-1 Color temperature adjustment

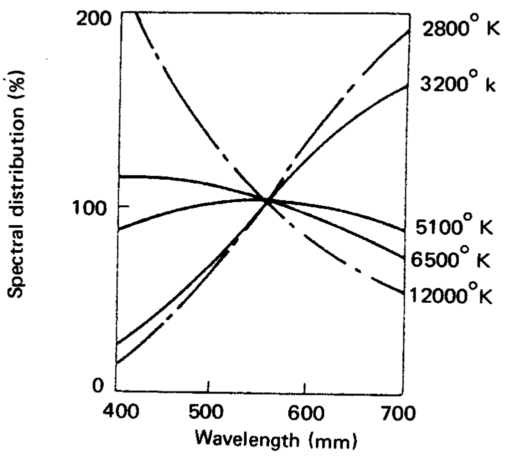
The color temperature adjustment is performed to correct the differences in the conditions of the object and the basic design of camera (matches gains of R and B channels to G so that white balance is precisely obtained under a 3200°K incandescent lamp).
White balance adjustment methods are classified into - 1) method using optical color conversion filter 2) method varying the gains of R and B channels based on G channel.

VK-C800 matches white balance using both optical and electrical method.

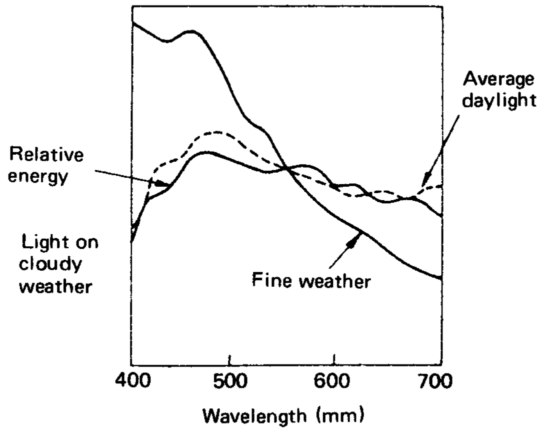
Fig. 4-1 a, b show the spectral distribution of the color temperature of the object and the spectral energy distribution of various natural light sources.
The energy distribution in nature always changes depending on the color temperature of the object being shot, the weather, season, time, etc. as is seen in Fig. 4-1 a, b.
An essential point among the functions of the camera is to set the camera to completely match the color temperature of the object.

To match the color temperature, operate the check filter built in the operation panel first, and then turn the color temperature adjustment knob to adjust while viewing the indication lamp in the finder.
The point where the lamp inside the finder goes off is the point where white balance matches. However, the lamp may not go off when the object is dark, and a luminance of more than 300 Lux is required.

This cirucit becomes an alarm circuit when the power save switch is set to the power save mode. The lamp lights to show that the power save switch is in the PWR SAVER (STANDBY for UK-C800E) position.



(a) Spectral distribution of various color temperatures of object



(b) Spectral energy distribution of various natural light source

Fig. 4-1

4-2. Functions of various indicators

Various indicators are used for VK-C800. These are all integrated into the electronic finder; it is possible to collect various data as well as monitoring with the finder.

The indicator uses red and green LEDs to give indications and alarms.
These indicators not only perform the indication and alarm operations shown below but also perform the operations shown in Table 4-1 in sequence with camera or VTR operation.

It is required to understand that these indicators are provided with other indication and alarm functions as well as the original functions.

	V: VTR start (green)	L: Underexposure (red)	B: Battery alarm (red)	W: Bad white balance (red)
POWER SAVE switch set to "NORM" (OPERATE)	1) Interlocking operation with Remote control switch 2) Lights during VTR REC running 3) Goes off in the VTR PAUSE mode 4) Goes off at the VTR tape end Note: Lights (REC 9V) when the camera connector pin 6 is set to "L" level.	1) Flashes when there is insufficient light and the video level is below the specified value. 2) Lights with the "Exposure correction" switch set to "ON" (Alarm indication) 3) Goes off in other cases than 1) and 2) above. Note: When the auto-iris, color temperature check and the correction filter are operated, and the VTR level drops below the specified value, L flashes.	1) Flashes when receiving the battery low "Alarm" signal from VTR. 2) Goes off in other cases than 1) Note: Flashes when DC1.2 ~ 1.8V is superimposed and supplied to the audio input line, and goes off when it is less than 0.6V.	1) Circuit operates only when White balance check switch is set to "CHECK" side. 2) Lights only when the color temperature does not match on the "CHECK" side; goes off when it matches.
POWER SAVE switch set to "PWR SAVER" (STANDBY)	1) In pause mode in any condition (not related to on/off of trigger switch: normally power is supplied to this circuit)	Does not operate.	Does not operate.	Does not operate.

Table 4-1 DESCRIPTION OF VARIOUS INDICATOR OPERATIONS

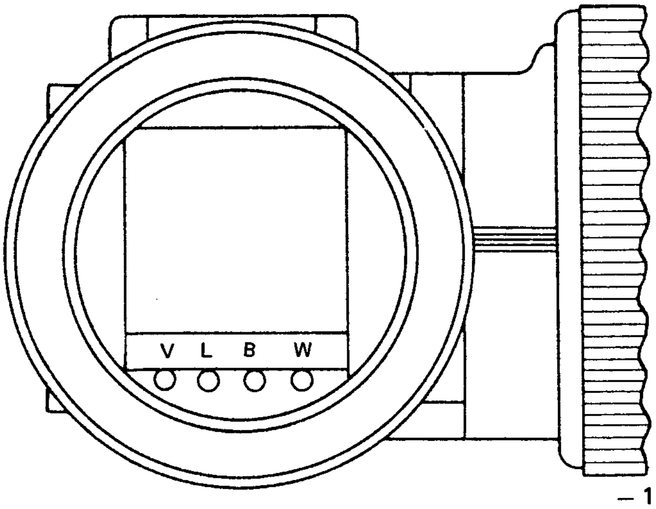


Fig. 4-2 Indicator arrangement plan

Chapter 5 Description of Circuits

5-1 Video signal process system

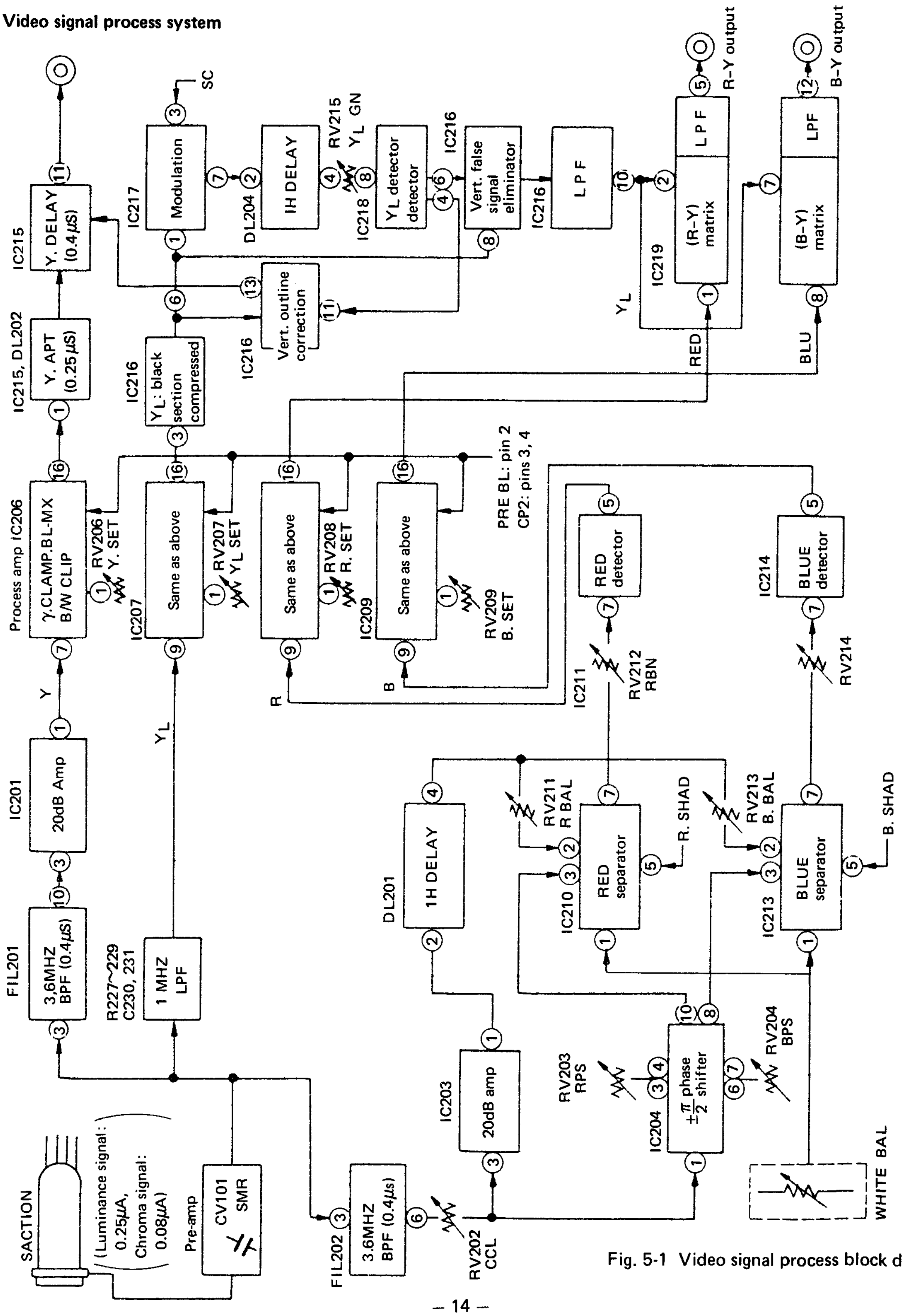

SACTION
(Luminance signal: 0.25µA, Chroma signal: 0.08µA)
Pre-amp
CV101 SMR
FIL201
3,6MHZ BPF (0.4µS)
IC201
20dB Amp
Y
Process amp IC206
γ.CLAMP.BL-MX B/W CLIP
RV206 Y. SET
IC215, DL202
Y. APT (0.25µS)
IC215
Y. DELAY (0.4µS)
R227~229 C230, 231
1 MHZ LPF
YL
IC207
Same as above
RV207 YL SET
IC216
YL: black section compressed
IC216
Vert. outline correction
IC217
Modulation
SC
DL204
IH DELAY
RV215 YL GN
IC218
YL detector detector
IC216
Vert. false signal eliminator
IC216
L P F
IC219
(R-Y) matrix
L P F
R-Y output
(B-Y) matrix
LPF
B-Y output
RED
BLU
Same as above
RV208 R. SET
IC209
R
Same as above
RV209 B. SET
B
PRE BL: pin 2
CP2: pins 3, 4
RED detector
IC211
RV212 RBN
IC214
BLUE detector
RV214
DL201
1H DELAY
RV211 R BAL
IC210
RED separator
R. SHAD
RV213 B. BAL
IC213
BLUE separator
B. SHAD
IC203
20dB amp
IC204
±π/2 phase shifter
RV203 RPS
RV204 BPS
WHITE BAL
FIL202
3.6MHZ BPF (0.4µs)
RV202 CCL

Fig. 5-1 Video signal process block diagram

Color separation principle of VK-C800 was described in Chapter 1. The video signal process system up to production of Luminance signal (Y), and 2 color difference signals (R-Y), and (B-Y) is described in this chapter.

In Fig. 5-1, the signal obtained from SATICON H9374A by signal multiplexing is first lead to the pre-amp.
This level is 0.25μA with Y component and 0.08μA with CHROMA component in the standard shooting mode.

5-1-1. Pre-amp circuit

The 0.25Vp-p signal output is obtained with a pre-amp input impedance of approx. 3kΩ, and voltage gain approx. 50dB.
The S/N of the camera is substantially determined by noise of this pre-amp initial stage.

In general, the output impedance of the camera tube is very great, and the high frequency output component decreases due to the output capacity of the tube itself and the pre-amp input capacity.
As a result, the chroma signal with the modulation frequency around 3.6MHz determined by the pitch of the stripe filter is conspicuous in its extreme deterioration of S/N comared with the luminance signal.
The Percival coil method, inserting a series coil in the input circuit is used to improve this S/N deterioration, is employed.
This method divides the output capacity of the camera tube and the input capacity of the pre-amp by coil, and causes resonance with the frequency of approx. 3.6MHz.

As is seen in Fig. 5-2, S/N is improved by approx. 5dB in fc (chroma signal modulation frequency) by employment of a percival coil.

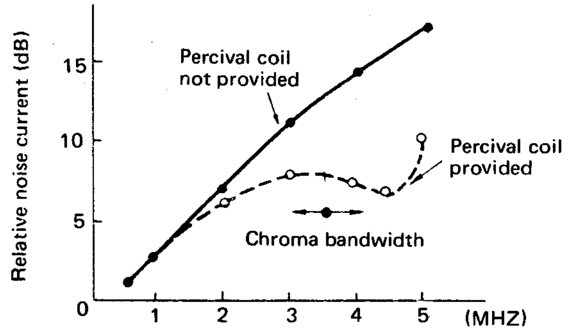


Fig. 5-2 Improvement of S/N by use of Percival coil

5-1-2. Y process circuit

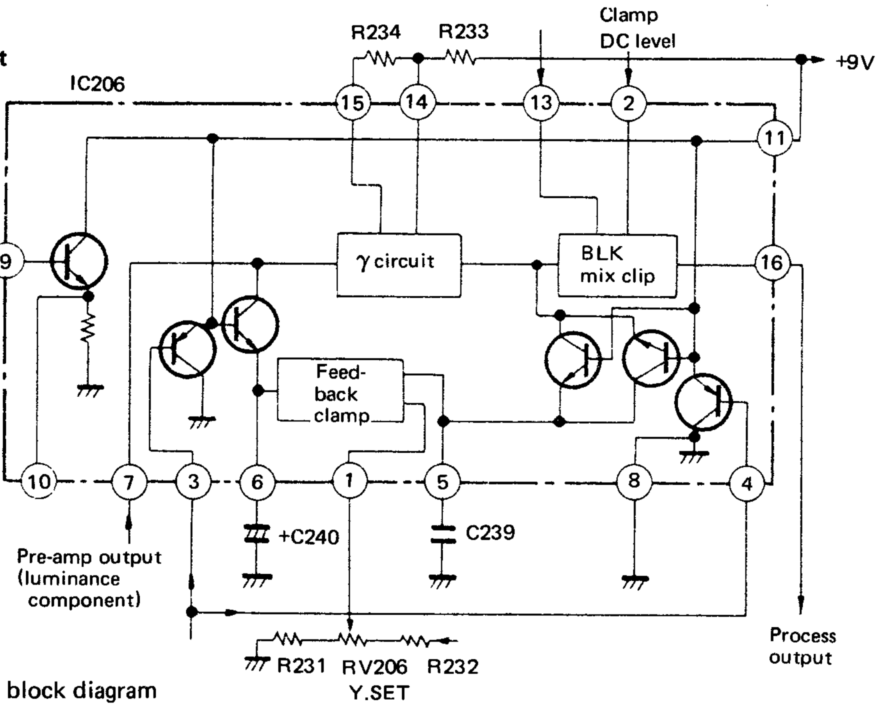


Fig. 5-3 Process circuit block diagram

With the video signal from the pre-amp, the luminance component passes through LPF (3MHz) and the chroma signal component is eliminated. Impedance of LPF is 1kΩ, so approx. 0.4μS delay is produced. Luminance component is amplified through IC201 by 20dB, and lead to the process circuit IC206 as 0.5vp-p.
The internal circuit of IC206 is shown in Fig. 5-3. Its main functions are shown in the following.

- Clamp
- γ Correction
- Blanking mix
- White clip
- Black clip
- Blanking gate

All the input pins of IC206 are at high impedance, so direct connection of the sync signal generator, etc. is possible. The γ correction and the black level are DC-controlled, so 4 channels can be controlled by one common bias.

1) γ correction circuit

The input from IC206 pin 7 is input to the γ circuit and γ is set to 0.45 because the SATICON with $\gamma = 1$ is used; this is determined by R234 and R233 which are connected to pins 14 and 15.

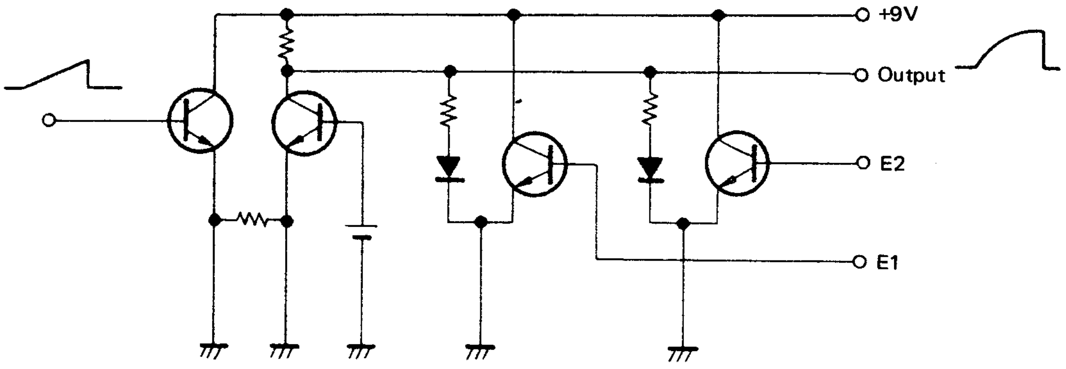


Fig. 5-4 γ amp basic circuit

The γ circuit operation is described on Fig. 5-4.

The sawtooth wave input applied to the input side as shown in the diagram is non-linear-amplified with similar contact by the voltage set by E1 and E2, and selects the voltage of E1 and E2 so that they match $\gamma = 0.45$.

As a result, the top of the input sawtooth wave is amplified so that it is non-linear with respect to the output side, and the correction curve as shown in Fig. 5-5 is obtained.

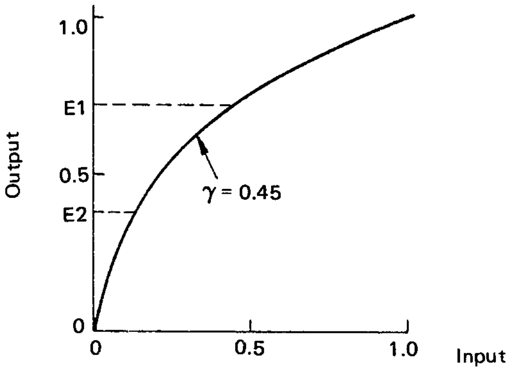


Fig. 5-5 γ correction curve

2) Linear clip circuit

Synchronizing noise is mixed with the pre-amp output signal during the BLK period caused by jumping of the deflection pulse, etc.

The video signal level is raised, and if it is excessive, the picture quality may deteriorates or the VTR may malfunction. To prevent this, the clip circuit is installed to remove the synchronizing noise during the blanking period as well as to set the output level of camera within the rated value. Fig. 5-6 shows the waveform of the linear clip operation.

3) Feedback clamp circuit

It is required to DC-fix the black level which is the reference of the signal, when signal processing the correction and linear clip level.

As is seen in Fig. 5-3, the black level fluctuation in the output of γ circuit is sample-held by CP2; this voltage is compared with the clamp potential (pin 1) and amplified; by this output, the emitter/follower output is clamped.

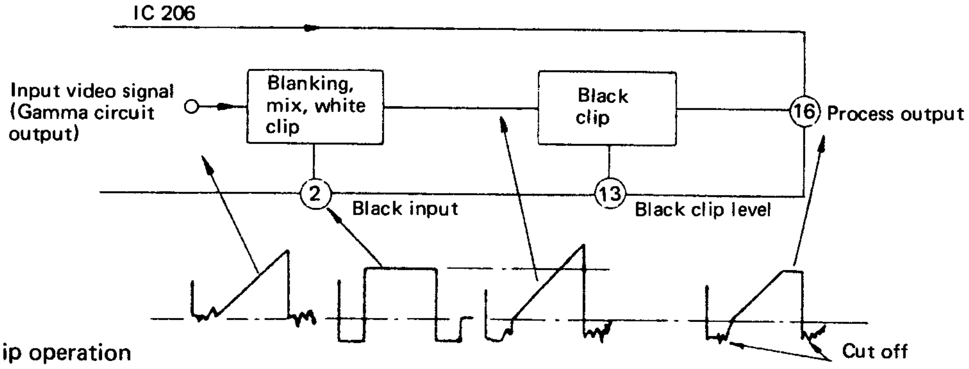


Fig. 5-6 Linear clip operation

Charge corresponding to the sampling hold voltage is charged to capacitor C239 attached externally to pin 5. The feedback clamp output charge is charged to capacitor C240 externally attached to pin 6, and when CP2 enters pin 3, the transistor switch is activated to fix the black level section of the input signal to C240 potential.

5-1-3. Y aperture correction circuit

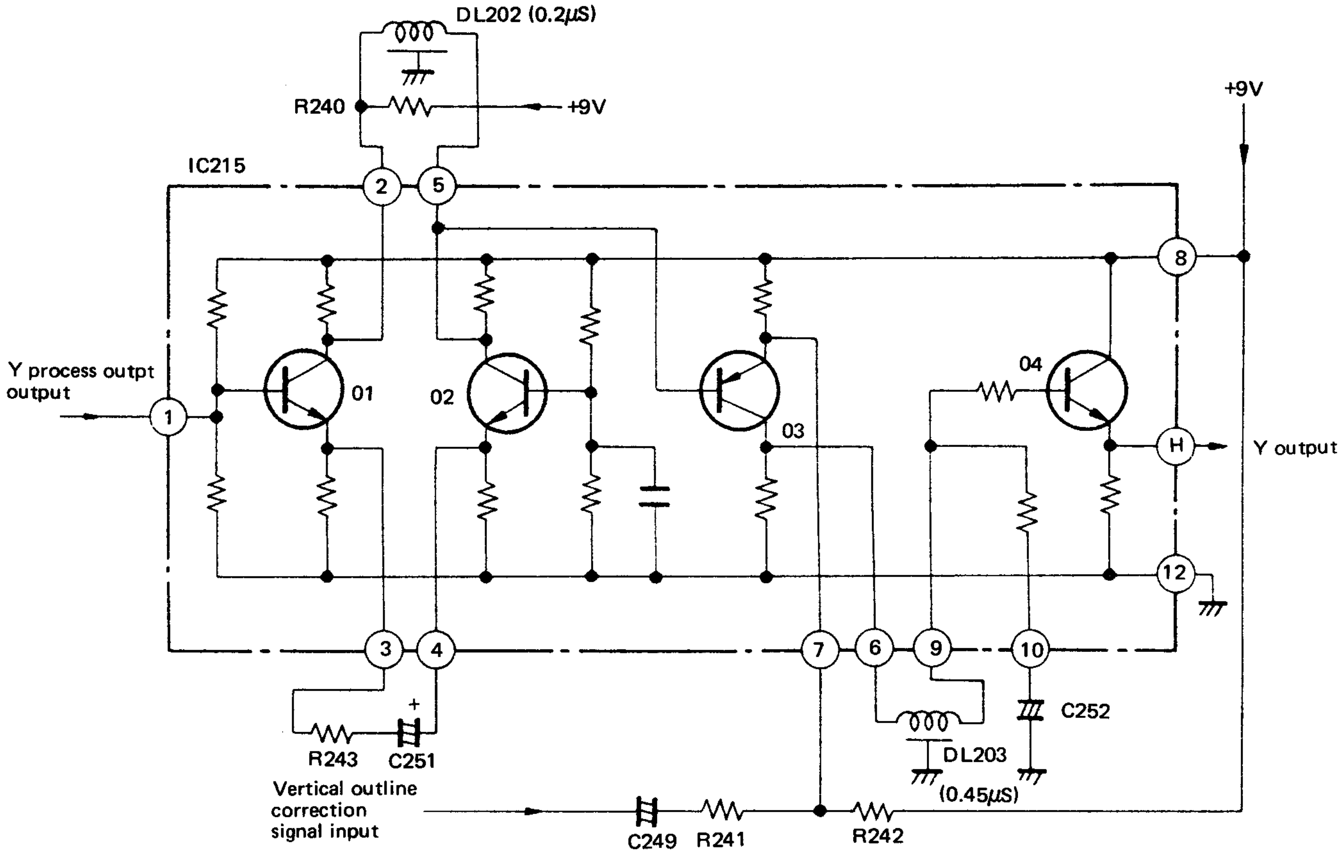

DL202 (0.2μS)
R240
+9V
+9V
IC215
2
5
8
Y process outpt output
1
01
02
03
04
H
Y output
12
3
4
7
6
9
10
+
R243
C251
C252
DL203
(0.45μS)
Vertical outline correction signal input
C249
R241
R242

Fig. 5-7 Y aperture circuit

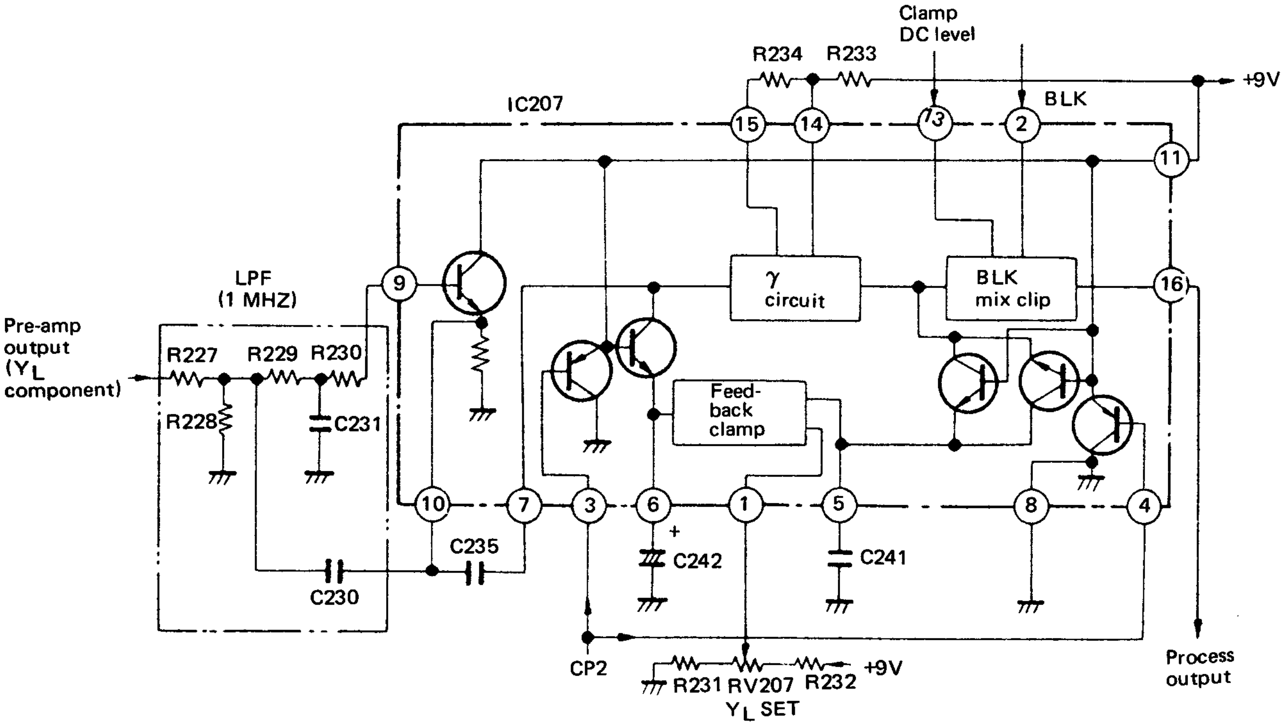

Clamp DC level
R234
R233
+9V
BLK
IC207
15
14
13
2
11
LPF (1 MHZ)
9
γ circuit
BLK mix clip
16
Pre-amp output (YL component)
R227
R229
R230
R228
C231
Feed-back clamp
10
7
3
6
1
5
8
4
C235
+
C242
C241
C230
CP2
R231
RV207
R232
+9V
YL SET
Process output

Fig. 5-8 Process circuit block diagram

Aperture correction is applied by IC215 to the luminance component processed in the Y process circuit.

The input level to this IC215 is approx. 1.0Vp-p. Q1 and Q2 correct the deterioration of the high frequency component of the luminance signal caused by the horizontal aperture distortion by means of the 0.2μs DL202. The timing adjustment is performed by the phase matching delay coil (DL203) inserted between Q3 and Q4, to match the phase of the luminance signal and the chroma signal.

The vertical outline correction signal described later is applied to Q3 emitter from pin 7.

5-1-4. YL process circuit

YL is the narrow frequency chroma signal obtained from the luminance signal which corresponds to the chroma signals and B, and the signal to form G from matrix of R and B.

R and B are separated from the modulated signal based on the "vertical correlation" principle described previously; it is required to form YL in the frequency band processing in the same way as that applied in this process.
As a result, YL is frequency band limited by approx. 1MHz by the active LPF filter formed through the initial stage of the process amp. as shown in Fig. 5-8.
Furthermore, the process output signal is BLK-compressed and lead to the matrix circuit.

YL is specially processed during this period to eliminate the false signal; this is described later.

5-1-5 Chroma separation and detection circuit

Fig. 5-9 shows the chroma separation and detector circuit. The chroma signal output from the pre-amp and passed through the 3.6MHz BPF (FIL202) is adjusted to approx. 50mVp-p through RV202 (CCL chroma carrier level), and distributed to 2 systems - IC204 (phase shifter circuit) and IC204 (20dB amp).
The former is the ±π/2 phase shifter circuit to separate chroma, and the latter enters the 1H delay circuit.
(Refer to Fig. 1-5 Color separation circuit system)

The signal entering IC204 (Phase shifter) is applied with phase-shift, phase-delay by RV203RPS (red phase shift), and phase-advance by RV204 BPS (blue phase shift), first. The adjustment method of this phase shift adjuster is: it is adjusted so that the Cy (cyan), G and B components are zero in the R channel output when the color pattern is shot. (Tracking with R.BAL).
It is adjusted so that Ye(yellow), G and R output components are zero in the B channel output, in the same way. (Tracking with B.BAL).
The R channel delay phase component is output from IC204 pin 10, and B channel advance phase component is output from pin 8, and are applied to the chroma separation IC210 pin 3 and IC213 pin 3.

Both IC210 and IC213 are ICs used for modulation/demodulation of AN614; the inputs from pin 2 and pin 3 are added and synthesized.
The signal which is to be applied to pin 2 is the 1H delayed chroma signal: it is amplified by IC203 and produced by the supersonic delay element of DL201.

The insertion loss of DL201 is approx. 9dB, and impedance matching loss, 6dB - totalling 15dB; this loss is compensated by the 20dB amp in the previous stage.
RV211 is the adjuster for R.BAL (red. balance) and RV213, the adjuster for B.BAL (blue. balance); they set to approx. 50mVp-p respectively.

IC210 and IC213 are used for color temperature adjustment, red shading and blue shading correction signals using the modulation/demodulation input pins 1 and 5.

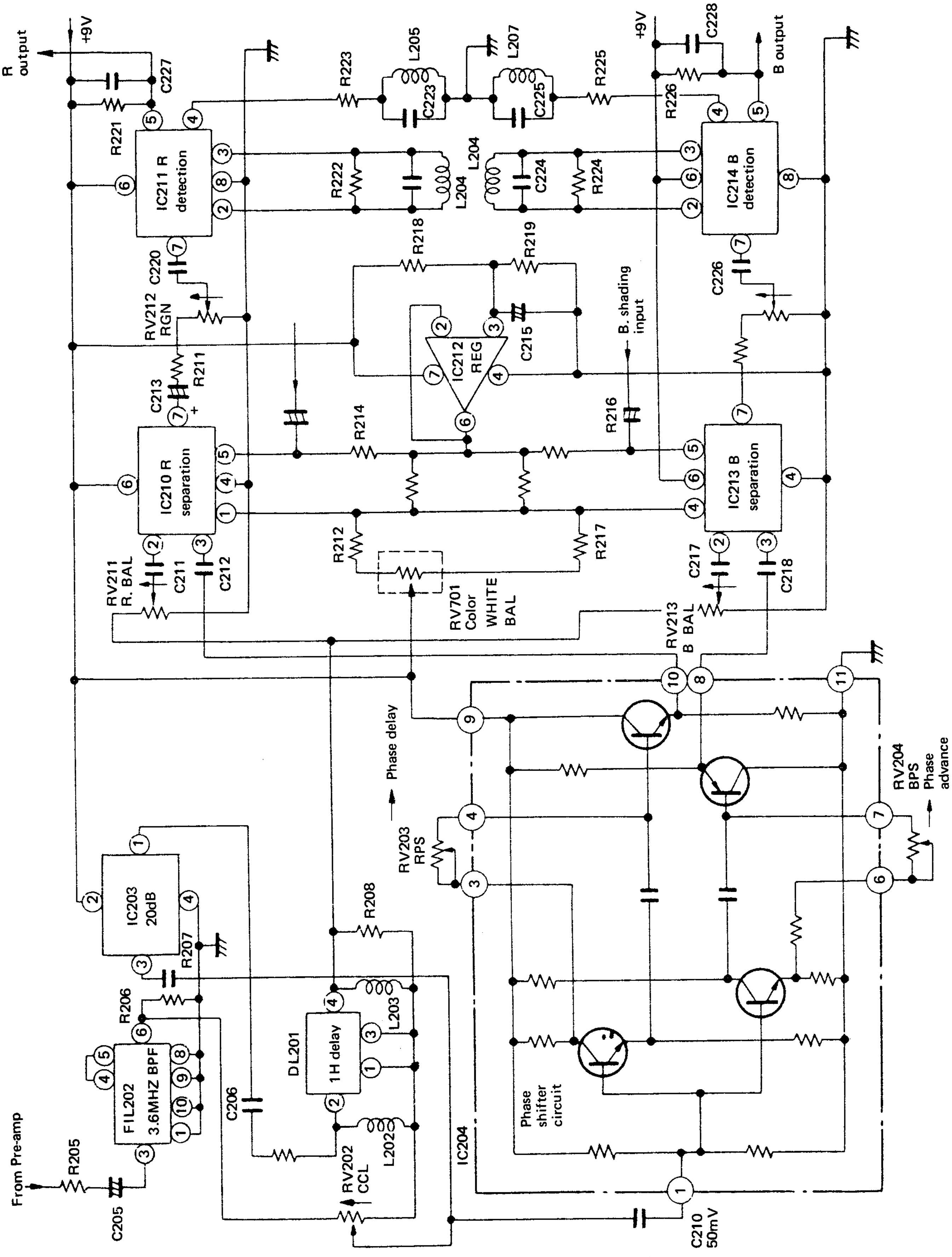
Standard set value of the color temperature adjustment is 3,000°K; it is required to vary R gain ± 2dB and B gain ± 4dB in the range from low temperature to high temperature (2,400°K - 4,200°K) and this is adjusted by RV701.

IC212 is an operational amplifier; it supplies a constant voltage to pins 5 of IC210, IC213.

The shading input is supplied from IC210, IC213 pins 5. These are described later.

The output signals from IC201, IC213 pins 7 have R and B separated from each other but still modulated.
These signals are adjusted to approx. 50mVp-p by RV212, RGN(red gain) and RV214, BGN(blue gain) respectively.

IC211 and IC214 are R and B bi-channel detectors, and detect the chroma base band component.
Pin 2/pin 3 parallel resonance circuits are used to trap the 3.6MHz modulation wave, and the pin 4 series resonance circuit, to trap the double higher harmonic component of 7.2MHz.
The detected 0.5Vp-p signals are obtained from pins 5 of these ICs respectively.



R output
+9V
C227
R221
IC211 R detection
R223
L205
C223
L207
C225
R225
R226
+9V
C228
B output
IC214 B detection
R222
C224
R224
L204
R218
R219
C220
RV212 RGN
C215
IC212 REG
B. shading input
C226
C213
R211
IC210 R separation
R214
R216
IC213 B separation
R212
R217
RV211 R. BAL
C211
C212
RV701 Color WHITE BAL
C217
C218
RV213 B BAL
Phase delay
RV203 RPS
RV204 BPS Phase advance
IC203 20dB
R207
R206
R208
FIL202 3.6MHZ BPF
DL201 1H delay
L203
L202
C206
RV202 CCL
IC204
Phase shifter circuit
From Pre-amp
R205
C205
C210 50mV

Fig. 5-9 Chroma separation and detector circuit

5-1-6 SAW. PARA shading generator circuit

It is well known that color shading due to uneven modulation characteristics of the camera tube, coil assembly, etc. occurs in cameras using the frequency separation system. In VK-C800, the dynamic focusing shading waveform is produced and superimposed over the DC230V supply to the focus electrode of the camera tube to correct this color shading by the circuit, and also the circuit signal correction shading waveform is produced.

Fig. 5-10 only shows the circuit for horizontal waveform in the SAW (sawtooth wave) and PARA (parabolic wave) generators.

The vetical SAW and PARA waveforms are produced using almost the same circuit configuation. The vertical and horizontal signals are mixed, and applied to the chroma separation circuit IC210, IC213 pins 5 shown in Fig. 5-9 with R and B separated.

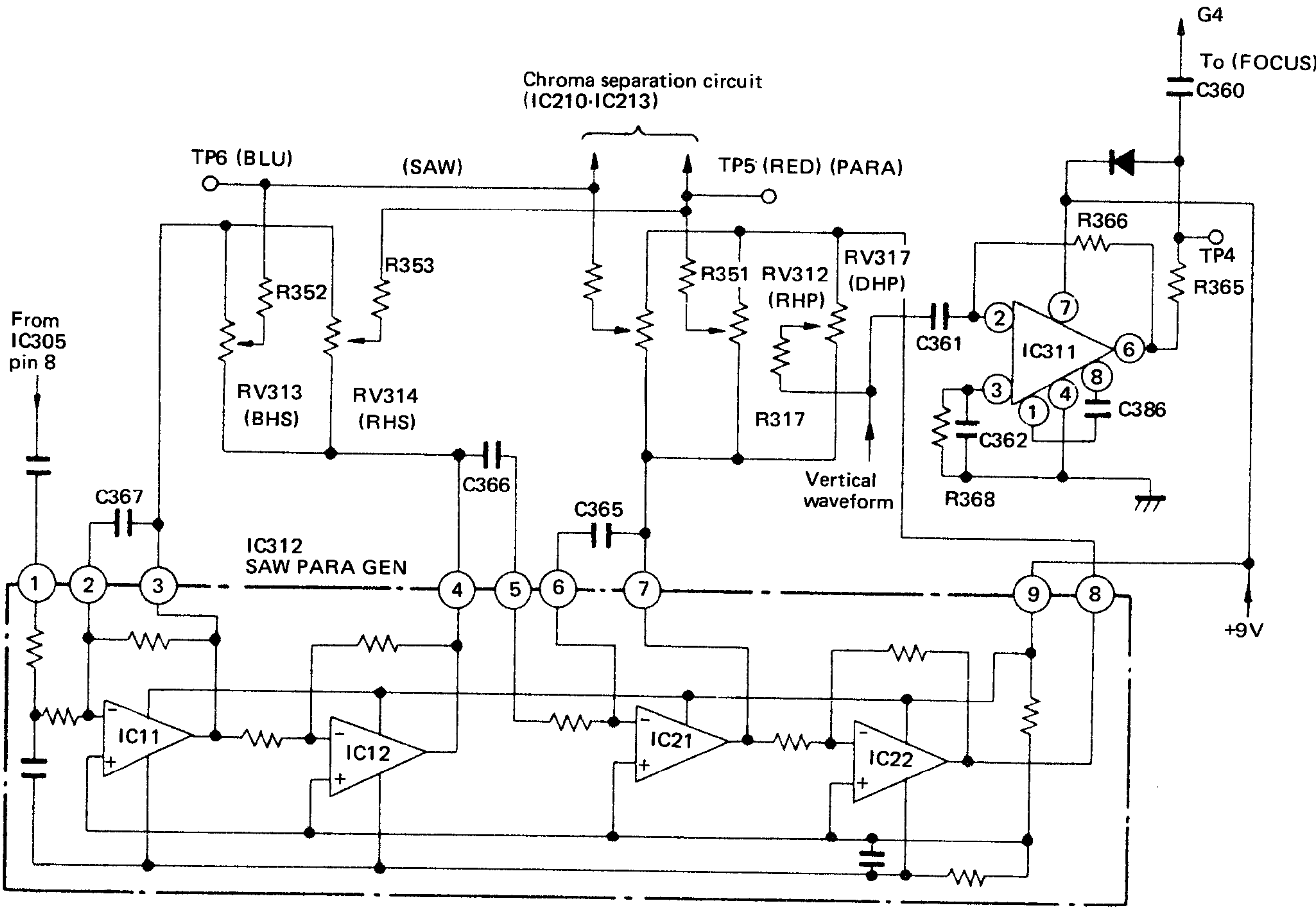

G4
To (FOCUS)
C360
Chroma separation circuit
(IC210·IC213)
TP6 (BLU)
(SAW)
TP5 (RED) (PARA)
R366
TP4
R365
R353
R352
R351
RV312
(RHP)
RV317
(DHP)
From
IC305
pin 8
RV313
(BHS)
RV314
(RHS)
C361
IC311
C386
C362
R317
Vertical
waveform
R368
C366
C367
C365
IC312
SAW PARA GEN
+9V
IC11
IC12
IC21
IC22

Fig. 5-10 SAW, PARA shading generation circuit

5-1-7. Chroma process circuit

3 chroma channel signal inputs YL, R and B are formed in this way and applied to the next process circuit.

In the process circuit, HD11732 is used for IC207 - IC209 as IC206 described in 5-1-2 "Y process circuit". They differ from IC206 only in their frequency bands but the signal processing inside the circuit is performed in the same way.

However, the input enters the clamp circuit from pin 9. The signal input from pin 9 is output to pin 10 via the emitter/follower circuit. It is input again from pin 7 via externally attached C235. This C235 is used for clamping. These ICs are controlled in DC series, and use the 4-channel process system.

As a result, satisfactory chroma input/output characteristics are obtained with both white and black balance.

5-2. False signal eliminator and vertical outline correction circuits

As described previously in 1-1 and 1-2, the generation of the vertical false signal cannot prevented in principle in the frequency separation system. This is because vertical cor-

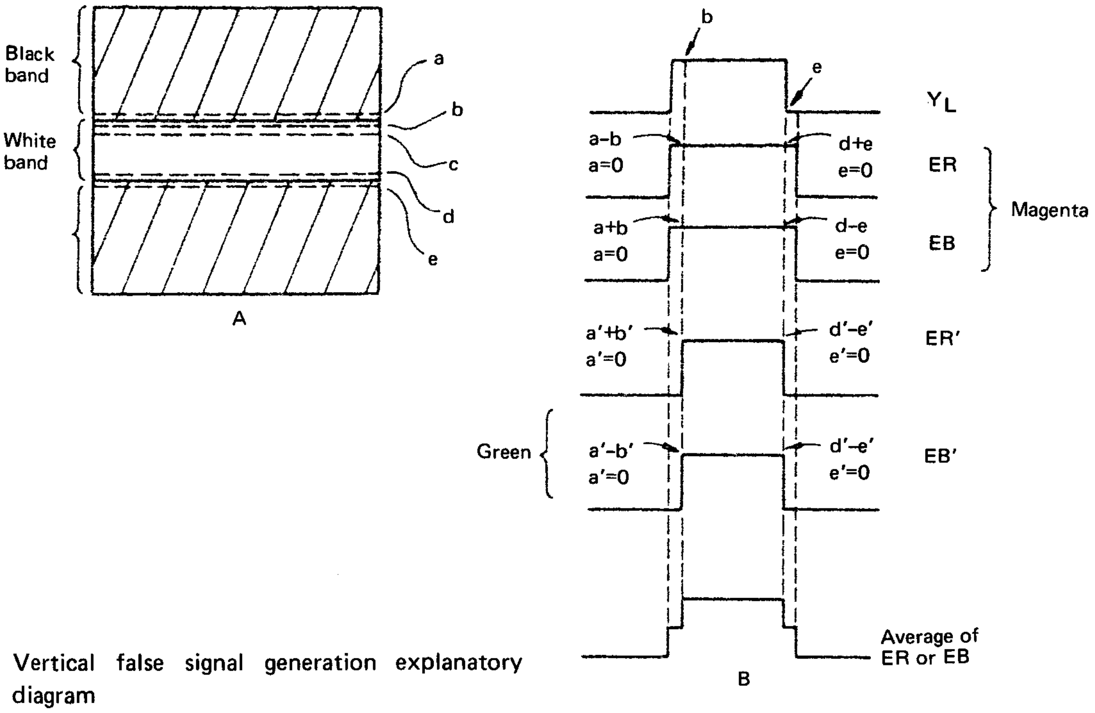


Fig. 5-11 Vertical false signal generation explanatory diagram

relation is used. The circuit to eliminate or reduce this false signal has been studied in various ways.

An eliminator circuit is also used in the VK-C800. The principle of generation and elimination of this false signal is described below.

Fig. 5-13 a shows an example of color error generated at the vertical edge; the case with the center of the vertical direction white, and a black band object is shot from its top and bottom is assumed.

Considering the continuously scanned adjacent scanning lines a, b, c, d and e, the chroma component of the signal is shown by the formulae a, b, c, d and e. (Refer to formulae 5 and 6 in page 4).

That is, the false signal is generated at the edge where the object changes from black to white, or white to black.

This condition can be explained by Fig. B when formulae a - e are used.

That is, during scanning of b, 1H delayed a and b are added or subtracted, and ER, EB are produced.

Even if the Ea to be added is zero, both ER and EB are output by addition or subtraction, so no false signal appears at the edge. Next, at the first scanning e when the object changes over from white to black, Ed is present but Ee is zero. So both ER and EB are output normally.

That is, both ER and EB are present at the black edge, so the magenta false signal appears.

Consider the case when the scanning line position moves a little, next. The chroma output to scanning lines a - e is as shown in Ea' - Ee'.

In the rise to white from black, at that time, Eb is nearly zero and the chroma signal is not present. This means that only YL is present and the white edge is colored green.

When such an object is shot actually, these coloring pheena change; - sometime it appears on the edge and sometime not - depending on the condition of the object in relation to the phase of the scanning line.

The average value of these can be shown with the lowest waveform of b and the difference between YL is assumed to be the false signals of magenta and green.

To reduce the above, there is a method to produce 1H delayed signal YL' from YL as shown in Fig. 5-14, and assume the average signal(YL+YL')/2 of YL and YL'to be the chroma signal and the VK-C800 uses this method. This is described on Fig. 5-1 schematic diagram and 5-15 IC206 Circuit diagram.

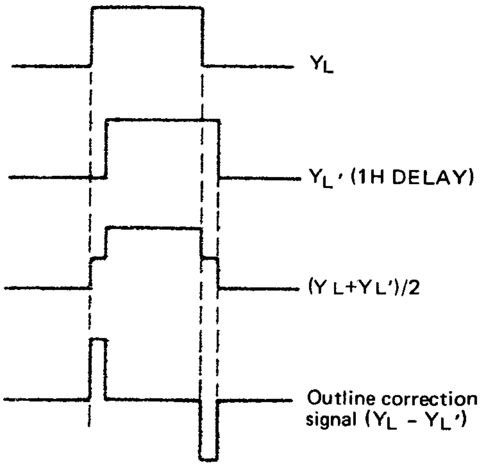


Fig. 5-12 Reduction of false signal and utilization of vertical outline signal

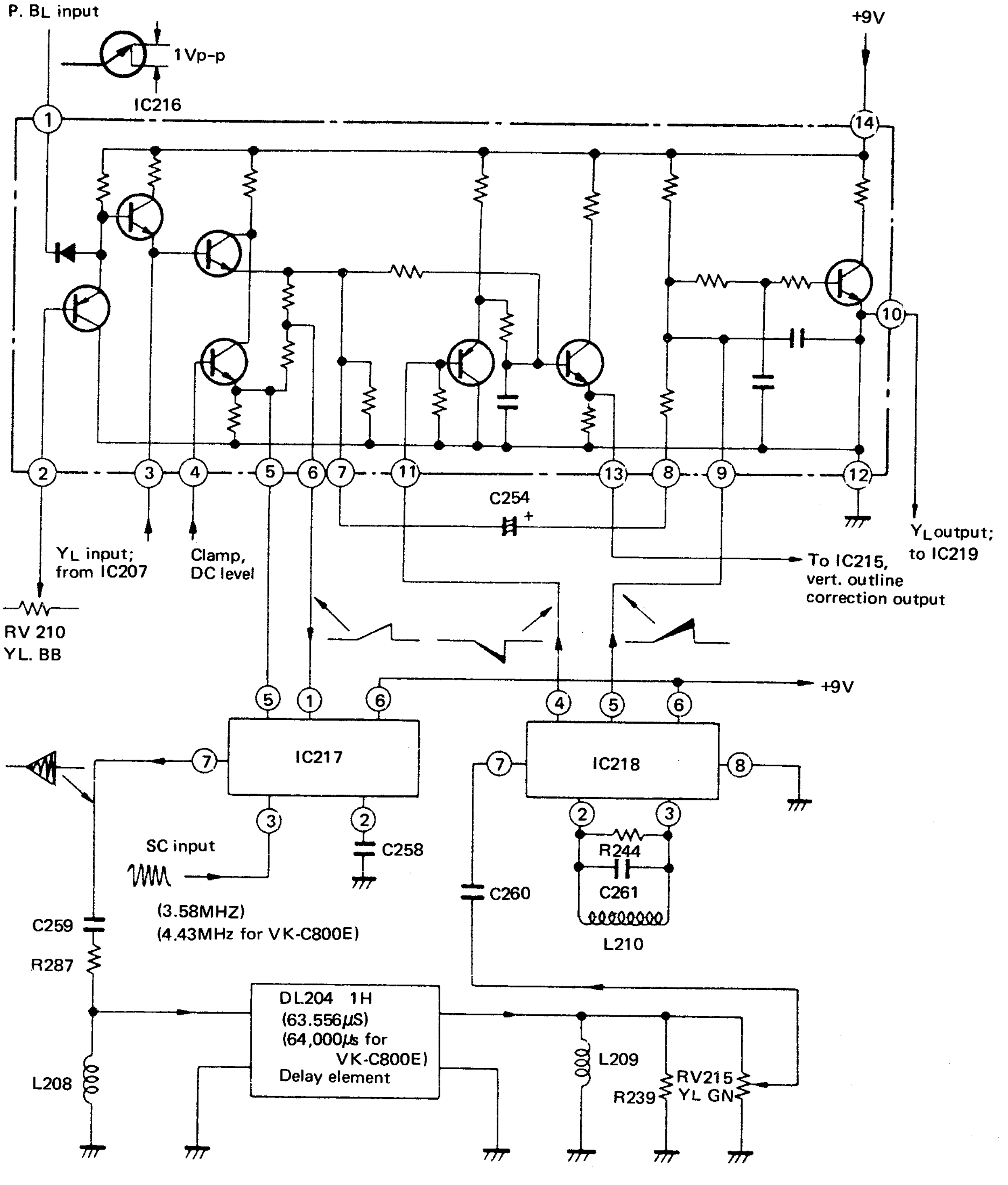

P. BL input
1Vp-p
IC216
+9V
1
14
10
2
3
4
5
6
7
11
13
8
9
12
C254
YL input; from IC207
Clamp, DC level
YL output; to IC219
To IC215, vert. outline correction output
RV 210
YL. BB
+9V
5
1
6
4
5
6
IC217
IC218
7
7
8
3
2
2
3
SC input
C258
R244
C261
C260
L210
(3.58MHZ)
(4.43MHz for VK-C800E)
C259
R287
DL204 1H
(63.556µS)
(64,000µs for VK-C800E)
Delay element
L208
L209
R239
RV215
YL GN

Fig. 5-13 Vertical false signal eliminator circuit

First, YL input from IC216 pin 3 is attenuated to 1/2 via the emitter/follower and appears at pin 6.

This signal is lead to modulator IC217 and modulated by the 3.58MHz (4.43 MHz for VK-C800E) sub-carrier signal. The modulated wave output obtained from IC217 pin 7 is delayed by 63.556µs (64,000µs for VK-C800E) by 1H supersonic delay element DL204 next.

This signal is gain-adjusted by variable resistor RV215 (YLGN) and then input to demodulator IC218.

The positive polarity 1H delay YL signal, YL', appears at IC218 pin 5, and the negative polarity 1H delay signal appears at pin 4.

The operation of the vertical false signal eliminator circuit is:

This positive polarity 1H delay YL' is applied to IC216 pin 9, and the non-delayed YL is applied to pin 8 from pin 7 via the externally attached capacitor C254.
As a result, the (YL + YL')/2 signal appears at IC216 pin 10; assuming this signal as the matrix chroma signal, the picture with the false signal reduced is obtained as described previously.
The 3.58MHz (4.43MHz for VK-C800E) carrier remains inside the detector output of IC218, so the LPF is included in the output section inside IC218 to remove the carrier component.

Next, the circuit operation to correct the vertical outline using this vertical false signal eliminator circuit is described in the following.

The negative polarity YL' output from IC218 pin 4 is lead to IC216 pin 11 and YL' is substracted, to form the YL-YL'signal as shown in Fig. 5-14.

As is shown in the diagram, in this vertical outline correction signal, the front edge rises with negative polarity and the rear edge rises with negative polarity.

5-3. Matrix circuit

The YL, R and B signals passing through the video signal processing system become the color difference signals in the next matrix circuit as explained in Fig. 5-16, Matrix circuit.
This circuit is composed of the R-Y circuit and B-Y circuit, and these 2 channels are housed in IC219.
The YL signal input to pin 2, with its polarity inverted, appears at pin 5 as emitter output.
At the same time, the R signal input to pin 1 appears at pin 5 with the same polarity. That is, the color difference signal of (R - YL) can be obtained.

C265 and C264 are the capacitors used for the active filter which limits the frequency band of the color difference signal.
The color difference signal of (B - YL) is obtained from pin 12 in the same way. The burst signal which is the reference signal of the color phase is applied to pin 7 via R252.
(For VK-C800E, the burst signal is also applied to pin 1 via R248.)

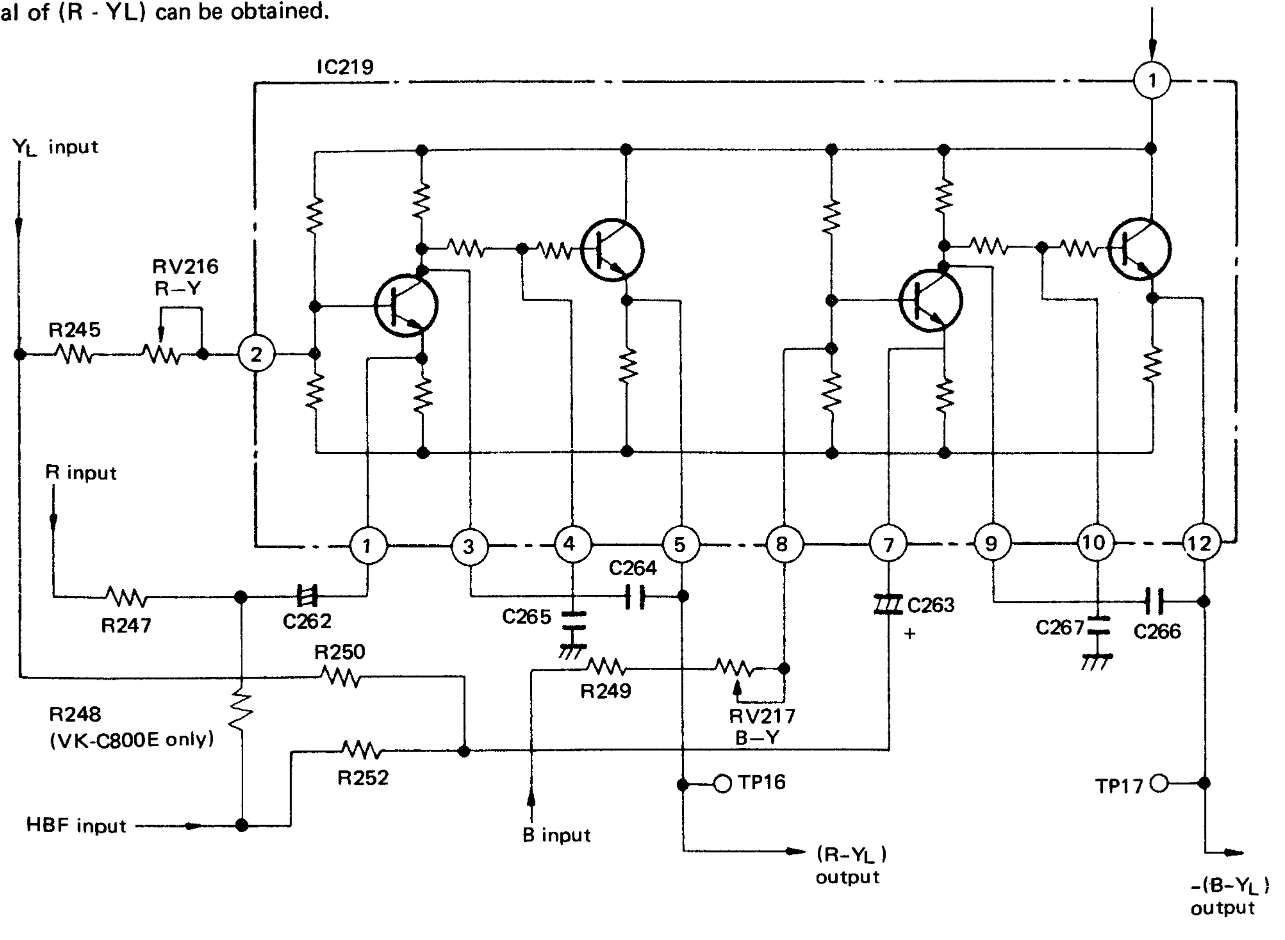


Fig. 5-14 Matrix circuit diagram

5-4. Encoder circuit and video output circuit

This is the circuit that converts luminance Y, color difference signals (R-Y), (B-Y) to the NTSC (PAL for VK-C800E) signal camera output.

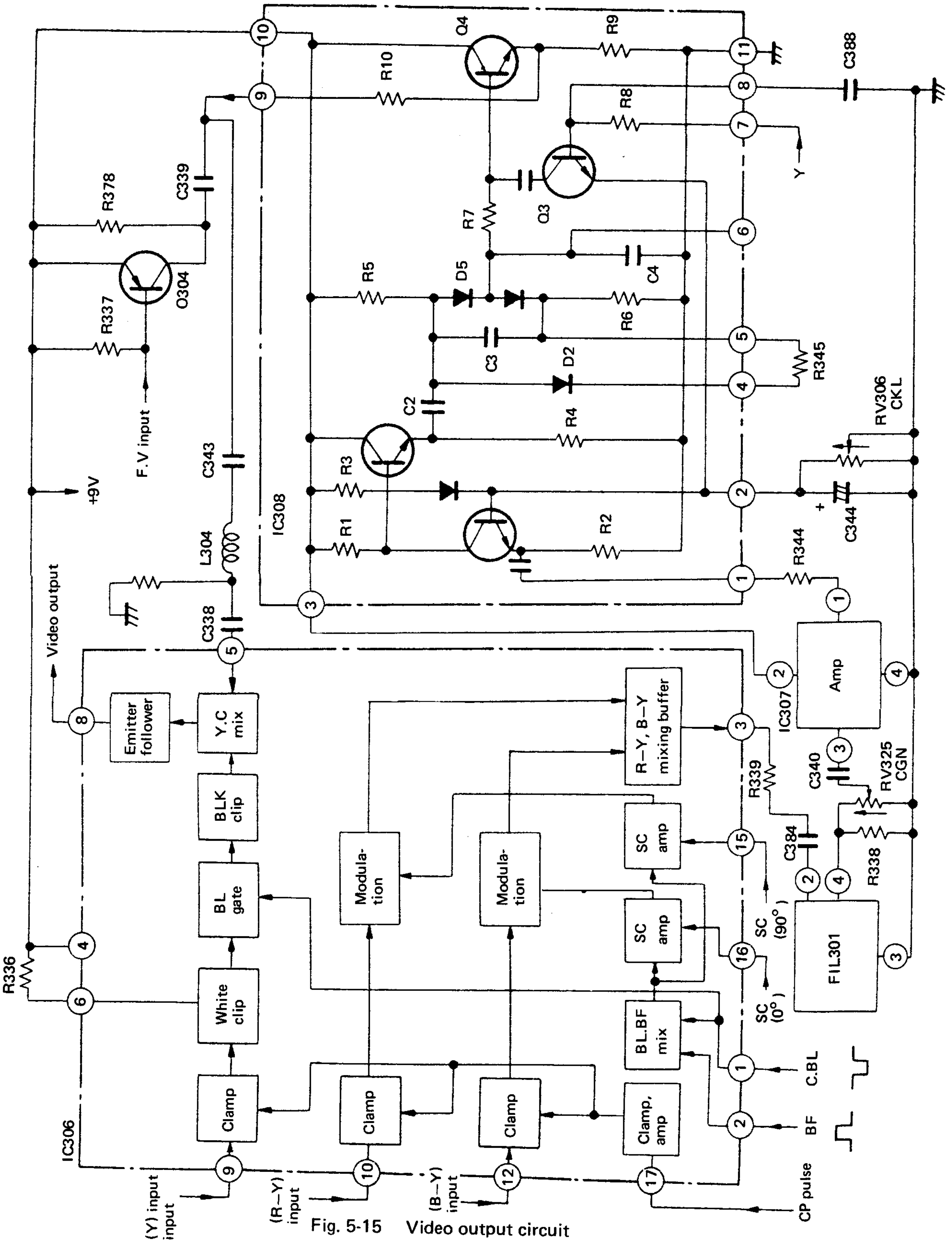

IC308
Q4
R9
R10
C388
R8
Y
Q3
R7
C339
R378
R337
Q304
R5
D5
C4
R6
C3
D2
R345
C2
R4
RV306
CKL
F.V input
+9V
C343
R3
R1
R2
+
C344
L304
R344
Video output
C338
Amp
IC307
Emitter follower
Y.C mix
R–Y, B–Y mixing buffer
C340
RV325
CGN
R339
BLK clip
C384
R338
BL gate
Modula-tion
Modula-tion
SC amp
SC amp
SC (90°)
FIL301
R336
White clip
SC (0°)
BL.BF mix
C.BL
BF
Clamp
Clamp
Clamp
Clamp, amp
IC306
CP pulse
(Y) input
(R–Y) input
(B–Y) input

Fig. 5-15 Video output circuit

Fig. 5-15 shows the video output circuit which is composed of encoder IC306 and IC308 which is used to suppress the chroma signal to low level.

The (R-YL), -(B-YL) color difference signals obtained from IC219 are applied to IC306 pins 10, 12, clamped, and then modulated, mixed by the sub.carrier 3.58MHz (4.43MHz for VK-C800E), and then output from pin 3. With its 1H-related noise and chroma signal random noise reduced by comb filter FIL301, this signal is gain-adjusted and amplified by IC307.

IC308 is the chroma suppression circuit; it drops the level when the chroma signal is low to improve the color shading which is particular in frequency separation, using the non-linearily of a diode.

The frequency separation system has defects such that shortage of beam is likely to occur at highlighted sections of fluorescent lamps, etc. causing green coloring at that section, etc.

This phenomenon greatly harms the picture quality, so in VK-C800, CKL (chroma killer level) adjustment is used to protect the high luminance section from being colored.

When the luminance signal level exceeds the specified value Q3 inside IC308 detects it and shuts off the chroma signal.

The output signal from IC308 pin 9, whose unnecessary frequency bnad is eliminated through L303, C343 of BPF, is mixed with the Y signal in IC306, and obtained from pin 8.

With the sync signal added, the video output signal becomes the complete NTSC synthesized video signal.

5-4-1. BL, BF mix circuit

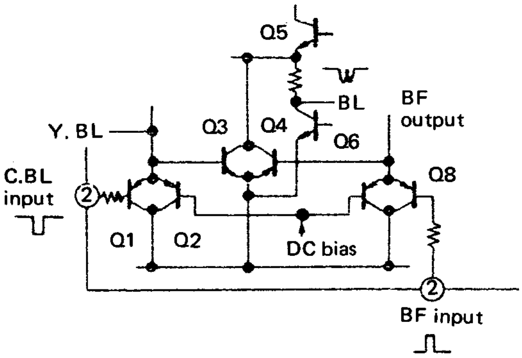


Fig. 5-16 BI, BF mix circuit

The Q1 base is fixed to a certain DC potential, so the level of the BL (blanking) pulse is limited by Q1 and Q2.

The BF signal is also level-limited by Q7 and Q8. These 2 signals are mixed by Q3 and Q4.

This signal is DC-shifted by Q6, applied to the SC amplifier circuit described later and it gates the sub.carrier signal.

5-4-2. SC(Sub.carrier) amplifier circuit

When the sub.carrier is applied to the base of Q3 which composes the differential amplifier together with Q4, sub. carrier signals with mutually inverted polarities are obtained in the collectors of Q3 and Q4.

DC offset of the output is regulated by Q2.

Q5 and Q6 are operated and Q3 and Q4 shut off to stop the sub.carrier output during the blanking period excluding the burst flag period.

This sub.carrier is divided in 2 systems - for the B-Y axis, and for the R-Y axis.

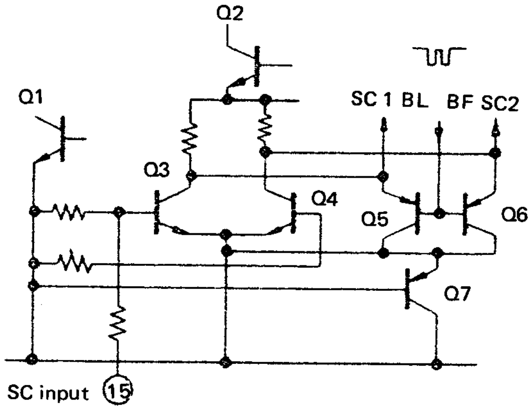


Fig. 5-17 SC amplifier circuit

5-4-3. Modulation circuit

Fig. 5-20 shows the circuit of the modulation section, and the waveforms at the A - G sections are shown in Fig. 5-21. When video signal A is applied to the base of Q1, and sub. carrier B, to the base of Q2, the signal shown in C is obtained at the common emitter.

When the reference DC voltage is applied to the base of Q6, and the sub.carrier, to the base of Q5, the carrier with its phase moved by 180° to C as shown in D is obtained at the common emitter.

When these signals are applied to Q3 and Q4, the signal as shown in E is obtained. The modulation waveform with its modulated signal the same as E and its carrier in reverse to that of E, as shown in F is obtained at the common emitter in the same way.

These signals are amplified by the differential amplifier composed of Q15 and Q16, the same phase component is suppressed and the balanced modulation signal as shown in G is obtained. The operation mentioned above is done for the B-Y axis and R-Y axis.

5-5 Sync circuit

The SYNC generator circuit of VK-C800 is composed of C MOS IC HD-440072. This IC is a Dual-in-Line, 28-pin plastic mold IC which is operated at +7V.

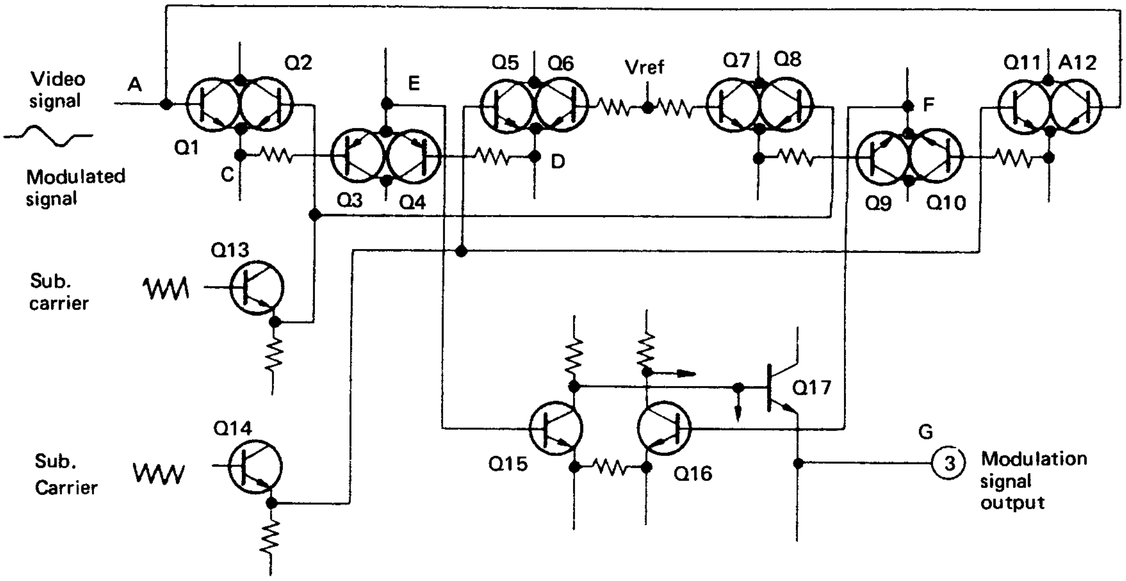

Video signal
A
Modulated signal
Q1
Q2
C
E
Q3
Q4
Q5
Q6
Vref
D
Q7
Q8
F
Q9
Q10
Q11
A12
Q13
Sub. carrier
Q14
Sub. Carrier
Q15
Q16
Q17
G
3
Modulation signal output

Fig. 5-18 Modulation circuit

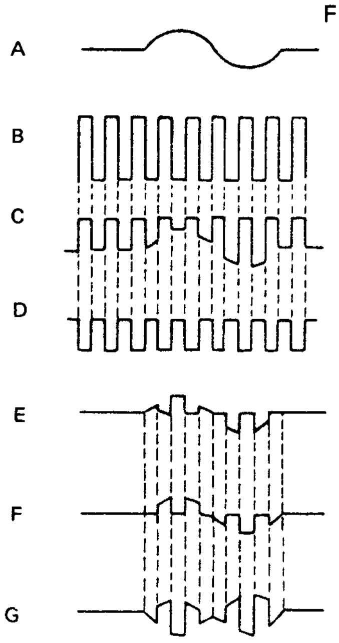


Fig. 5-19

This LSI is designed so that it can correspond to the different TV standard systems such as NTSC, PAL or SECAM by changing the wiring and elements a little.

Fig. 5-20 shows the pin arrangement viewed from the top of HD-440072.
Table 5-1 is its function table.

HD-440072 is provided with 2 reference oscillators - one produces the main clock pulse, the other, the aux. clock pulse.
Fig. 5-21 is the HD-440072 block diagram, and Fig. 5-22, HD-440072 peripheral circuit diagram. Section A is the crystal oscillator which uses the C MOS inverter; it oscillates with a frequency of 14.31818MHz (17.734476MHz for VK-C800E), 4 times the sub. carrier frequency.
This oscillation frequency is divided by 4 and becomes the sub.carrier frequency. In addition, the output signal divided by 161, and the output signal which is produced by dividing the output of the aux. oscillator (voltage control oscillator) by 184 are phase-compared.
The output of this comparator is converted to DC through the low pass filter at section C, to control the VCO in section B.
This is a PLL (Phase locked loop) circuit; the VCO oscillation frequency at section B is made 260 times the horizontal frequency.
This is divided by 2, and applied to the pulse forming circuit as the clock pulse to obtain the pulses required for HD, VD, SYNC, etc.

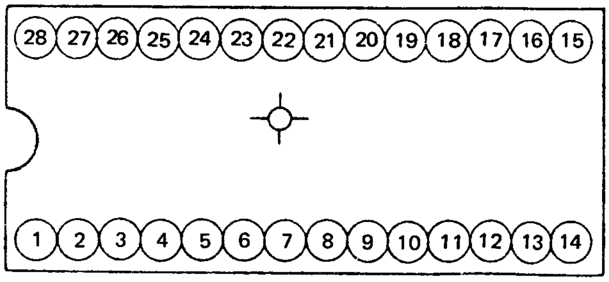

28
27
26
25
24
23
22
21
20
19
18
17
16
15
1
2
3
4
5
6
7
8
9
10
11
12
13
14

Fig. 5-20 Pin arrangement viewed from the top

Section D in the diagram is the network commonly used for both the power filter which supplied +7V to IC305 and the voltage dropper.
Section F is the C MOS inverter which operates as the polarity inverter which supplies the pulses required to sections of camera and operates as a buffer.

PIN NO.	NAME	FUNCTION	REMARKS
1	———		
2	———		
3	260fHOSC(NTSC) 280fHOSC(PAL)	Sub. oscillator	Input
4	260fHOSC(NTSC) 280fHOSC(PAL)	Sub. oscillator	Output
5	FILTER	LPF	Output
6	FILTER	LPF	Input
7	VD	Vert. drive pulse	For camera VD
8	C. HD	Camera horizontal drive pulse	
9	CP-1	Clamp pulse No. 1	
10	COMP. BLK. P	Composite blanking pulse	
11	BURST. FP	Burst flag pulse	
12	B. BLK	Beam blanking pulse	
13	B. GP	Black gate pulse	
14	VDD	Power application	
15	H. BF	Horizontal burst flag pulse	
16	SELECT IN	HIGH (NTSC), LOW (PAL)	
17	EXT. HD. IN	Horizontal gen lock pulse	
18	CP-2	Clamp pulse No. 2	
19	F. V IN/OUT	Vert. frequency signal	In common for input/output
20	LINE SWITCH	Line switching pulse	
21	COMP. SYNC	Composite sync signal	
22	FILTER	LPF	Input
23	FILTER	LPF	Output
24	4fSC OSC	Master oscillator	Input
25	4fSC OSC	Master oscillator	Output
26	SC(90°)(NTSC) SC(90°/270°)(PAL)	Sub. carrier	R-Y
27	SC (180°)	Sub. carrier	Y-B
28	GND	GND	

Table 5-1 HD-440072 FUNCTION TABLE

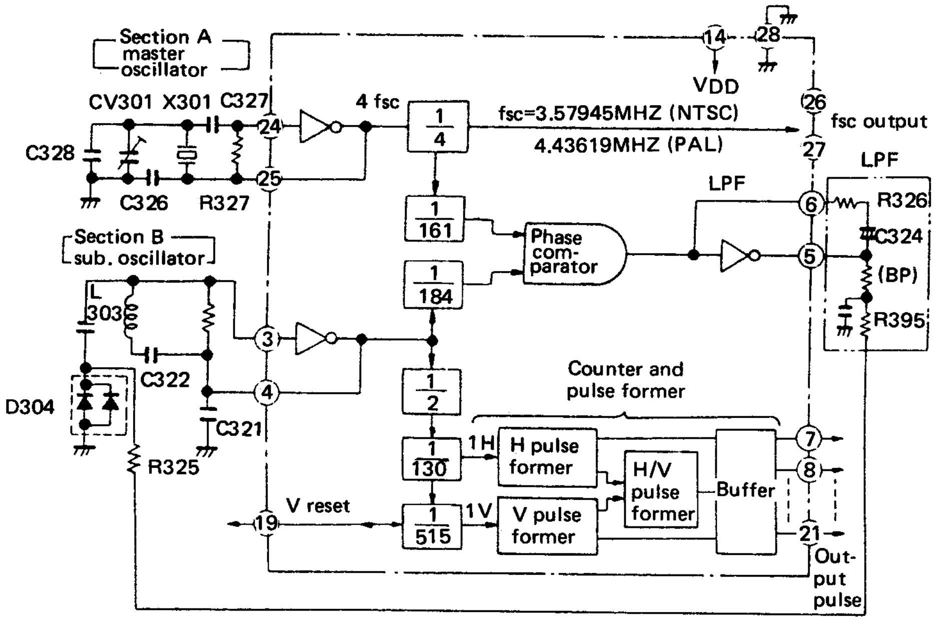

Section A
master
oscillator
CV301 X301 C327
C328
C326 R327
4 fsc
1/4
fsc=3.57945MHZ (NTSC)
4.43619MHZ (PAL)
VDD
14
28
26
27
fsc output
LPF
LPF
R326
C324
(BP)
R395
24
25
1/161
1/184
Phase comparator
6
5
Section B
sub. oscillator
L 303
C322
D304
C321
R325
3
4
1/2
Counter and
pulse former
1/130
1H
H pulse former
H/V pulse former
Buffer
7
8
V reset
19
1/515
1V
V pulse former
21
Output pulse

Fig. 5-21 HD-440072 block diagram

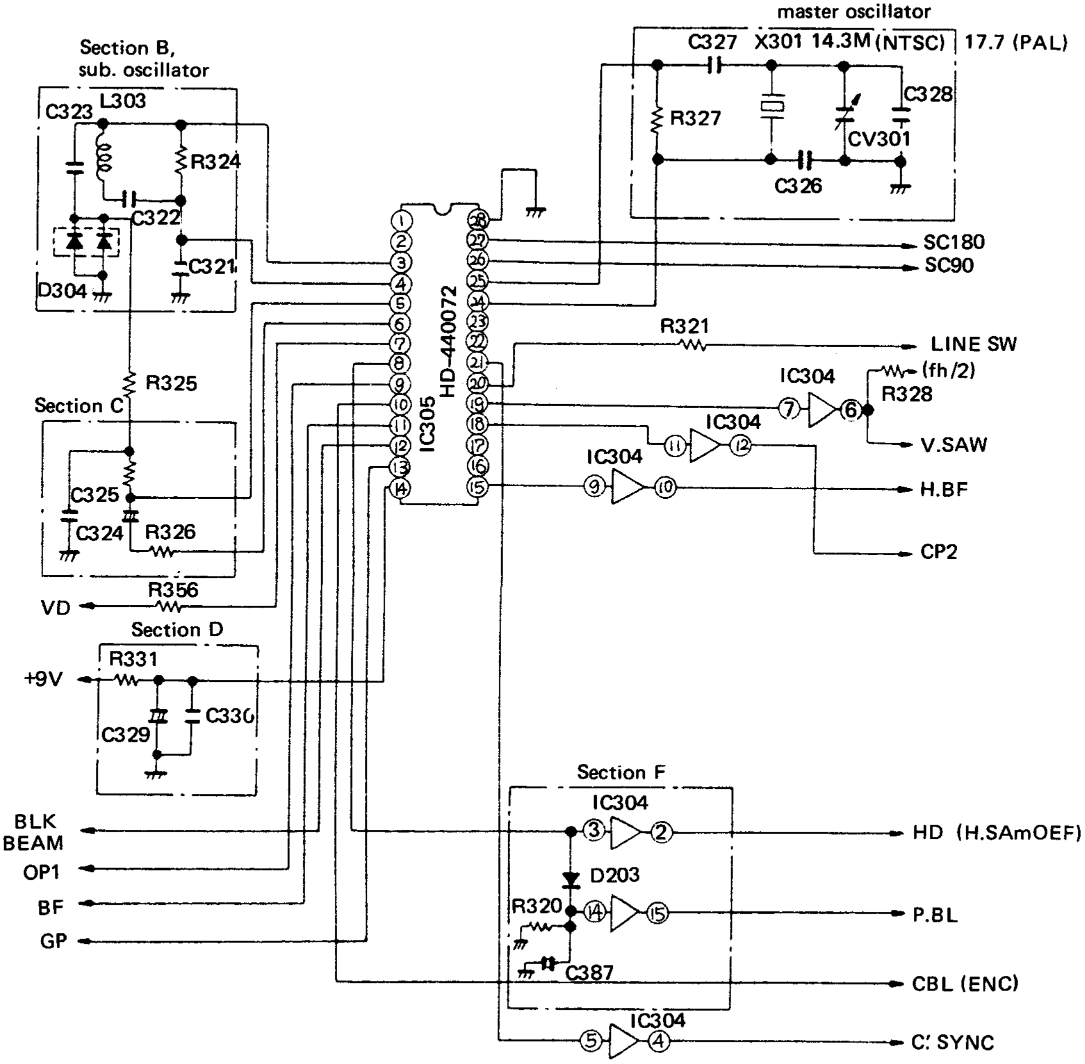

Section A,
master oscillator
C327 X301 14.3M(NTSC)
17.7 (PAL)
R327
C328
CV301
C326
Section B,
sub. oscillator
C323
L303
R324
C322
C321
D304
HD-440072
IC305
SC180
SC90
R321
LINE SW
IC304
(fh/2)
R328
IC304
V.SAW
IC304
H.BF
CP2
R325
Section C
C325
C324
R326
R356
VD
Section D
R331
+9V
C329
C330
Section F
IC304
BLK
BEAM
OP1
BF
GP
HD (H.SAmOEF)
D203
R320
P.BL
C387
CBL (ENC)
IC304
C: SYNC

Fig. 5-22 HD-440072 peripheral circuits

5-6. Deflection/high voltage circuit

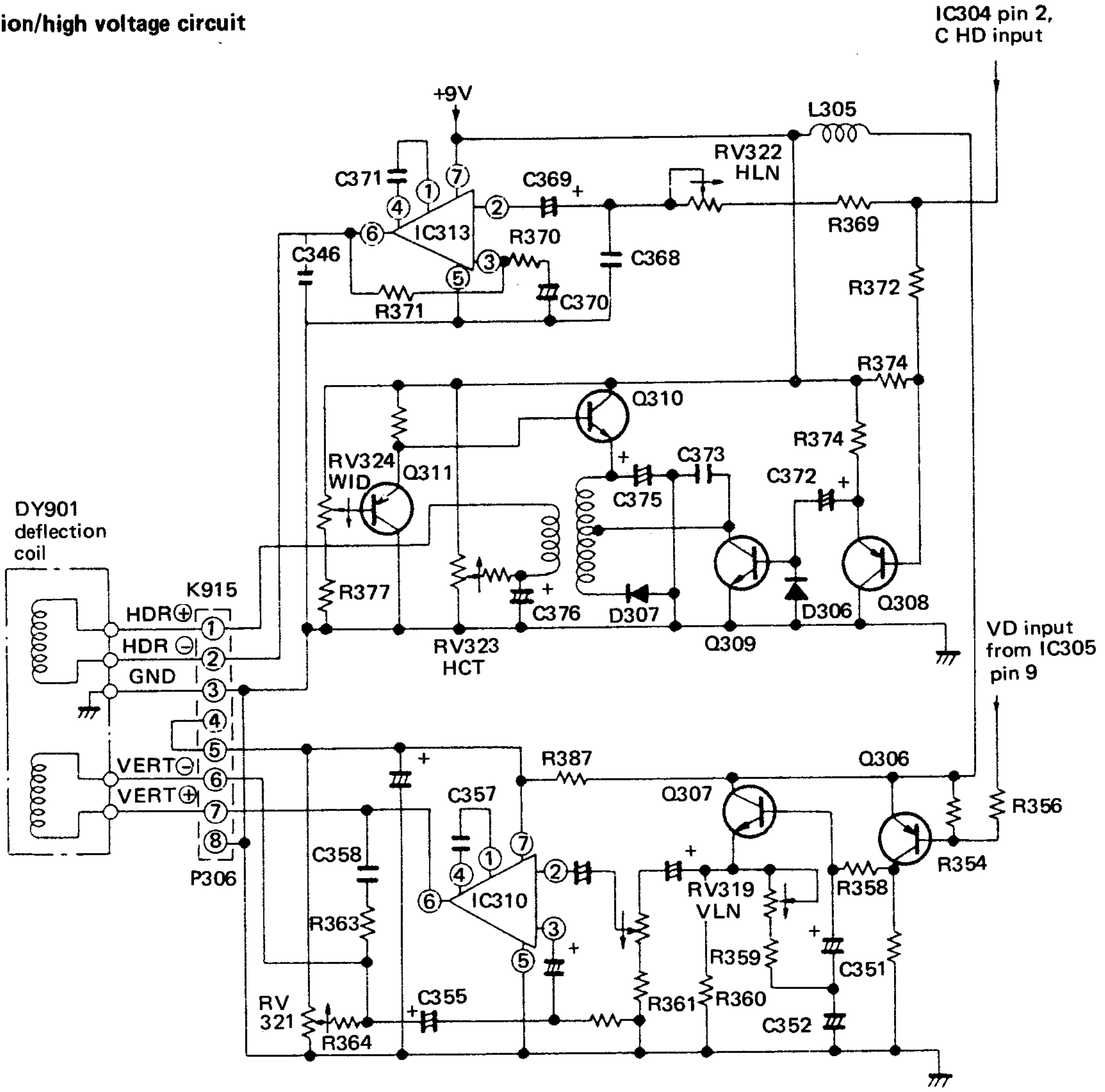

IC304 pin 2,
C HD input
+9V
L305
RV322
HLN
R369
R372
R374
R374
C371
C369
C346
IC313
R370
C368
R371
C370
Q310
C373
C372
RV324
WID
Q311
C375
DY901
deflection
coil
K915
HDR⊕
HDR ⊖
GND
R377
C376
D307
D306
Q308
RV323
HCT
Q309
VD input
from IC305
pin 9
VERT⊖
VERT⊕
P306
R387
Q306
Q307
R356
R354
C357
C358
IC310
RV319
VLN
R358
R363
R359
C351
RV
321
R364
C355
R361
R360
C352
①
②
③
④
⑤
⑥
⑦
⑧

Fig. 5-23 Horizontal/vertical deflection circuit

5-6-1. Horizontal deflection circuit

The horizontal circuit system is divided into the deflection system and the linearity correction system.

C.HD from IC305 is input, and the one switches and outputs the horizontal sawtooth wave current to the horizontal coil of the coil assembly.

The linearily of the deflection sawtooth wave is deteriorated by the DC resistance of the coil, switching saturation resistance of output transistor Q309, etc.

IC313 switches C.HD in the same way, and applies the reverse polarity sawtooth wave current to the return side of the deflection coil to compensate the deterioration of linearity. Q308 is the drive transistor, Q309, the deflection output and Q310, the power supply transistors; Q311 is the transistor for driving them.

The horizontal centering superimposes DC current over the coil to adjust the horizontal deflection position.

5-6-2. Vertical deflection circuit

When the deflection initial stage transistor Q306 receives the VD input from IC305 pin 7 and perform switching, the integral circuit composed of R358, C351 and C352 generates the vertical sawtooth wave voltage. IC301 is the power amplifier IC which amplifies this sawtooth wave voltage and make it the constant power output.

RV319(VLN) is used for linearity adjustment, and RV361 (HGT) adjusts the vertical amplitude, and RV364 (VCT) adjusts the deflection centering.

The output of IC310 pin 6 passes through the vertical deflection coil forming the negative feedback circuit to the pin, and the deflection coil is driven by the constant current.

5-6-3. High voltage circuit

VK-C800 uses an exclusive high voltage circuit differing from the conventional one which uses the horizontal deflection flyback.

As is shown in Fig. 5-24, the circuit reveives the line switching pulse from IC305 pin 20, and obtains the specified high voltage by boosting and rectification from the 9V power supply by means of the fh/2 switching.

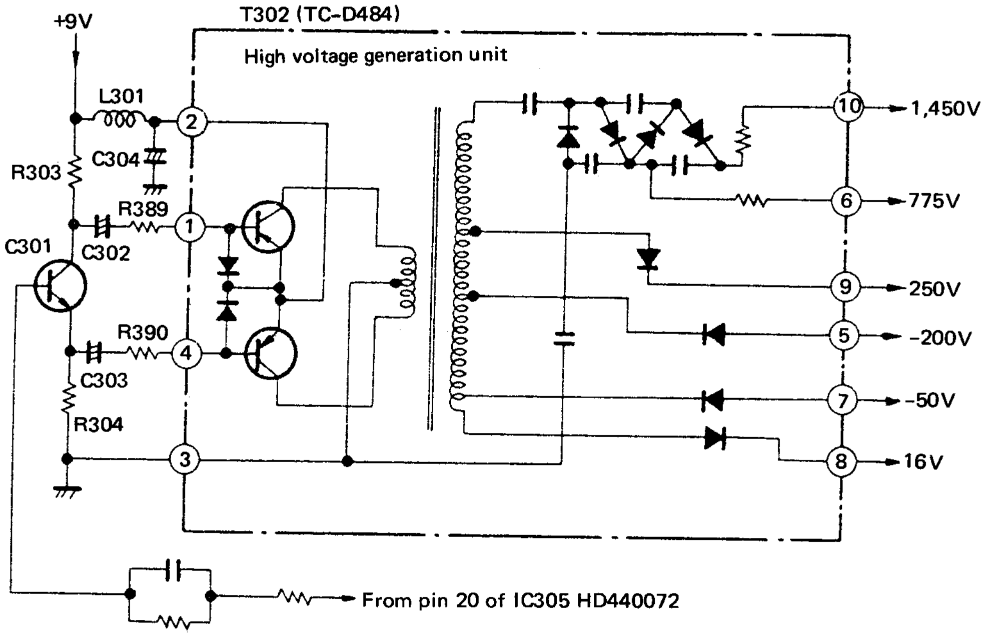

+9V
T302 (TC-D484)
High voltage generation unit
L301
C304
R303
R389
C301
C302
R390
C303
R304
1
2
3
4
10
6
9
5
7
8
1,450V
775V
250V
-200V
-50V
16V
R321
From pin 20 of IC305 HD440072

Fig. 5-24 High voltage generator circuit

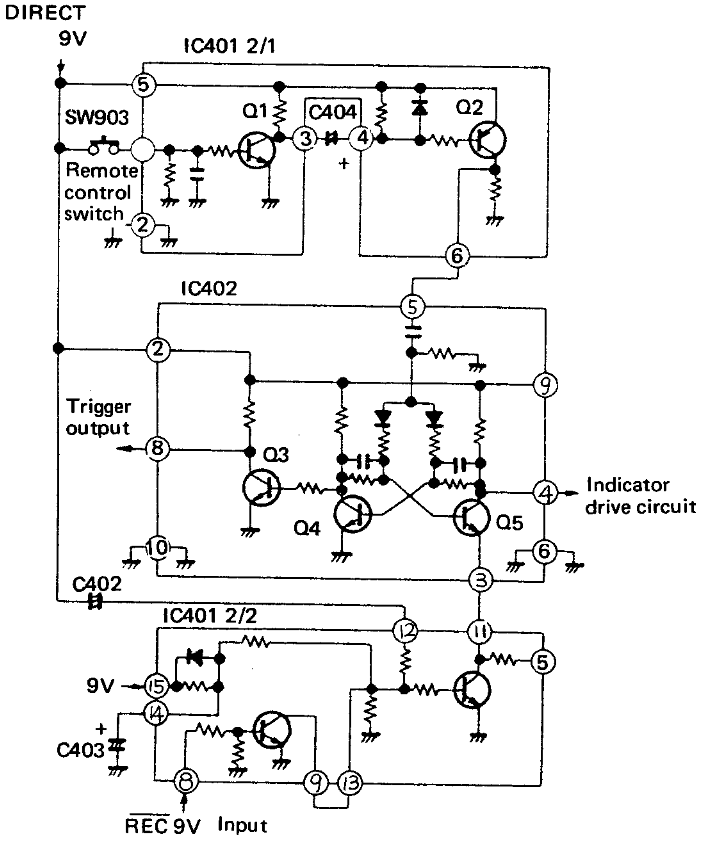

DIRECT
9V
IC401 2/1
SW903
Remote control switch
Q1
C404
Q2
+
5
3
4
2
6
IC402
Trigger output
Q3
Q4
Q5
Indicator drive circuit
2
8
9
4
10
6
3
C402
IC401 2/2
9V
15
14
+
C403
12
11
5
8
9
13
REC 9V Input

Fig. 5-25 VTR trigger circuit (Internal circuit of the IC and peripheral circuits)

5-7. VTR trigger circuit

This circuit is contained in the trigger PC Board and is composed of IC401 and IC402. The internal circuit of the IC and peripheral circuits are shown in Fig. 5-25.

Q4 and Q5 compose a flip-flop, and Q4 ON/Q5 OFF is the reset condition. When power is applied to the VTR, the power is supplied to the trigger circuit, REC 9V is applied to IC401 pin 8, so Q7 is set to ON, Q6 cut off, and the flip-flop operation is inhibited and it enters the reset mode. With the REC switch of the VTR pressed, REC 9V becomes 0V, Q7 is OFF, Q6 ON and INHIBIT of the flip-flop operation is released, and VTR enters the REC PAUSE mode with the flip-flop left reset. With the remote control switch pressed, the flip-flop is set and VTR enters the REC mode. So, the flip-flop inverts every time the remote control switch is pressed, and VTR repeats the REC mode and REC PAUSE mode.

IC401 pin 15 is set to 0V during the power-save mode, so the flip-flop operation is inhibited (reset mode) and VTR enters the REC PAUSE mode.

Another output of the flip-flop (IC402 pin 4) is sent to the indicator drive circuit (IC222 pin I5) of the VIDEO PC Board as the VTR indicator signal.

5-8. Indicator DET circuit

This circuit is composed of 3 circuits – the battery DET circuit, the video level DET circuit and the white balance DET circuit in IC221. All the DET outputs are sent to the indicator drive circuit as control signals to make the indicators light (flash) and go off.

The internal circuit of the IC and peripheral circuits are shown in Fig. 5-26.

5-8-1. Battery DET circuit

When the battery of VTR drops to less than a certain voltage, DC is superimposed over the returned AUDIO signal. This DC level is detected and the comparator output changes to 0V from +9V. (The indicator changes from off to flashing)

5-8-2. Video level DET circuit

Y signal enters IC221 pin 7 from IC206 pin 16 (Y process output), rectified by D1, R4 and C274 and becomes DC corresponding to the Y level. This DC level and the reference level of pin 9 are compared by the comparator (IC2/2); when the DC level becomes below the reference level, the comparator output changes from +9V to 0V. (This indicator changes from off to flashing). RV218(LIS) is set to the optional reference level.

5-8-3. White balance

This circuit indicates that the white balance matches when the white balance knob is turned to match the white balance; the R signal and B signal levels are compared and the detection signal is produced.

R and B signals input to IC221 pins 4 and 2 are rectified by C275 and set to the DC levels corresponding to the respective signal levels. When R and B levels are equivalent, the comparator output is set to 9V because the input offsets are provided with 2 comparators R7, R10 and R8, R9 respectively.

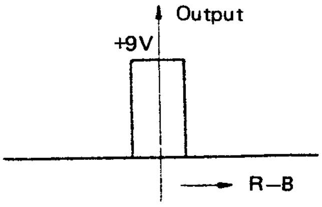


Fig. 5-27

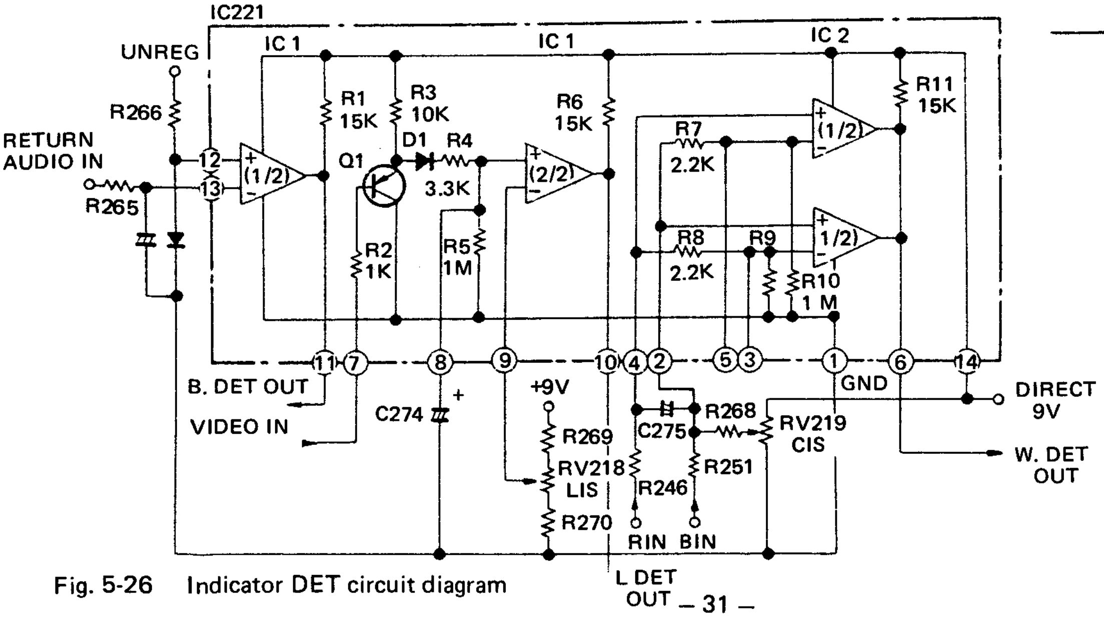


Fig. 5-26 Indicator DET circuit diagram

When it is set to R>B (B>R), the input level of IC2-2/2 (1/2) inverts and the comparator output is set to 0V. Fig. 5-27 shows the relation between the input level and output level. RV219 (CIS) is the variable resister used to match the R/B signal DC superimposition level; it is adjusted so that the comparator output is +9V when the white balance matches at the video output.

5-9. Indicator drive circuit

This circuit receives signals output from the indicator DET circuit and the VTR trigger circuit, and makes respective LEDs installed inside the viewfinder light and flash.

The circuit is composed of a flash signal generator oscillation circuit and 4 LED drive circuits in IC222. Table 5-2 shows its operation and Fig. 5-28, the internal circuit in the IC and the peripheral circuits.

	CAMERA CONDITION	IC 222 PIN VOLTAGE	LED
1.	When battery voltage drops	Pin 6 (battery DET input): 0V	(B) flashes
2.	When video level is too law	Pin 7 (video level DET input): 0V	(L) flashes
3.	During exposure correction switch operation	Pin 8 (Input from exposure correction switch): 9V	(L) lights
4.	White balance drift White balance check switch "OFF"	Pin 13 (Input from white balance check switch): +9V Pin 14 (White balance DET input): 0V or 9V	(W) goes off
	White balance check switch "CHECK"	Pin 13 (Input from white balance check switch): Open Pin 14 (White balance DET input): 0V	(W) lights
5.	During VTR REC	Pin 15 (VTR indicator input): 0V	(V) lights

Table 5-2 INDICATOR DRIVE CIRCUIT OPERATION MODE LIST

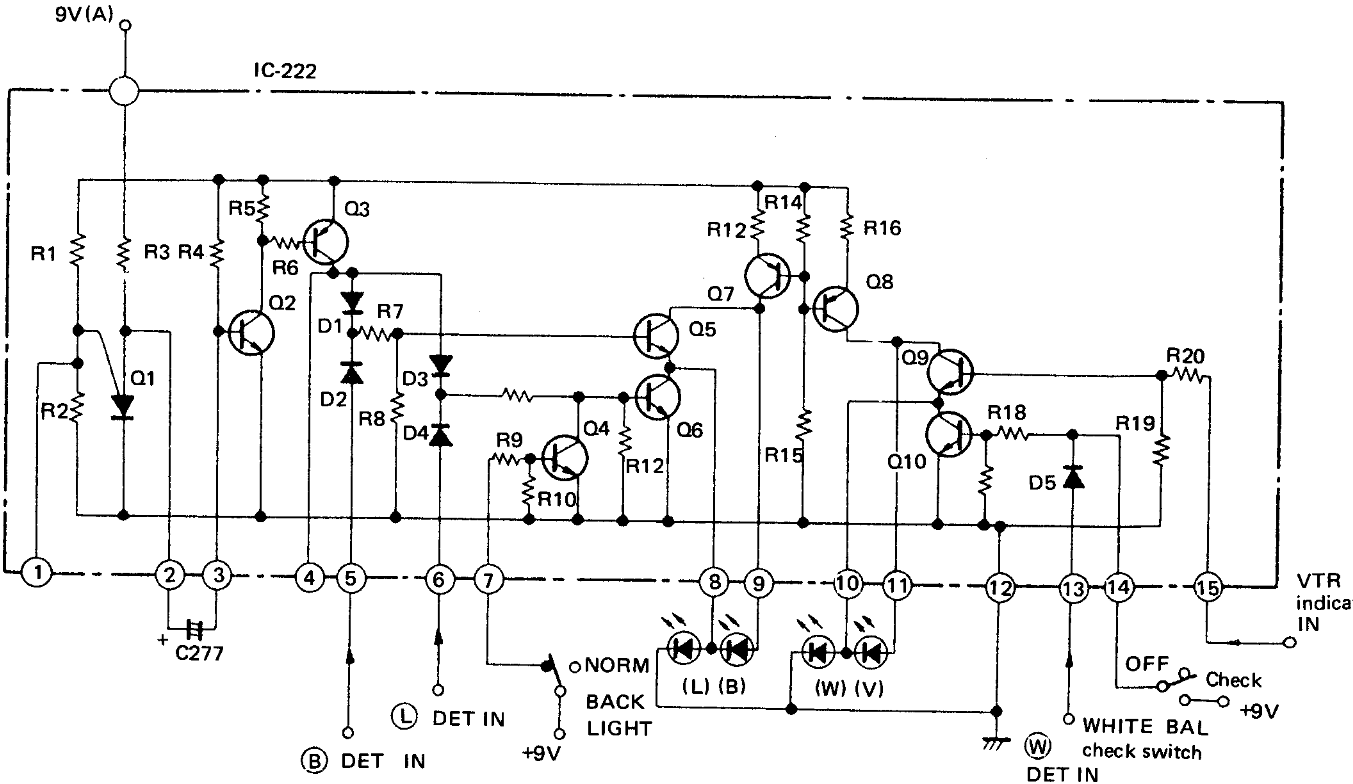

9V(A)
IC-222
R1
R2
R3
R4
R5
R6
Q3
Q2
Q1
D1
R7
D2
D3
R8
D4
R9
R10
Q4
Q5
Q6
R12
R12
R14
R16
Q7
Q8
R15
Q9
Q10
R18
D5
R19
R20
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
+
C277
VTR indica IN
NORM
BACK LIGHT
+9V
Ⓛ DET IN
Ⓑ DET IN
(L) (B)
(W) (V)
OFF
Check
+9V
WHITE BAL check switch
Ⓦ DET IN

Fig. 5-28 Indicator drive circuit diagram

5-10. Audio amplifier circuit

5-10-1. Mic amp circuit

This circuit amplifies the audio signal from the mic and supplies it to VTR; it is done by IC223. Gain of the overall amplifier is approx. 45dB, and a -20dB output can be obtained assuming that a -65dB mic is used.

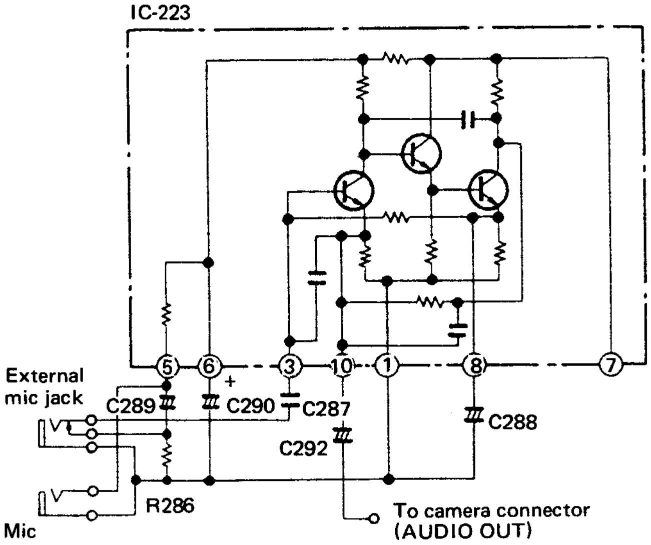

IC-223
External mic jack
C289
C290
C287
C292
C288
R286
Mic jack
To camera connector (AUDIO OUT)
5
6
3
10
1
8
7

Fig. 5-29 Mic amp circuit diagram

5-10-2. Earphone amplifier circuit

This circuit monitors audio through the earphone while monitoring the played back video signal through the viewfinder during VTR play; it is done by IC220.

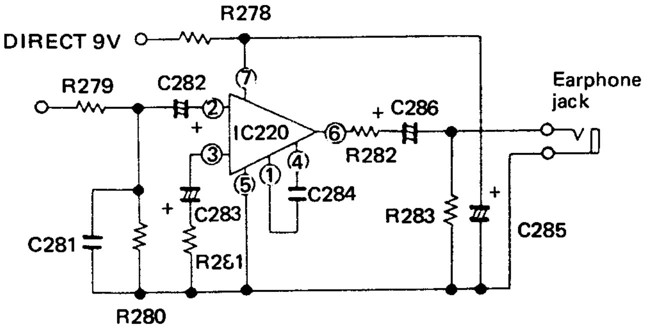

DIRECT 9V
R278
R279
C282
IC220
C286
R282
C284
C283
R281
C281
R280
R283
C285
Earphone jack
1
2
3
4
5
6
7

Fig. 5-30 Earphone amplifier circuit

5-11. Power-save circuit

When SW801 is set to the PWR SAVER (STAND BY VK-C800E) position, this circuit outputs the signal to the VTR to set it to the powersave mode.
When SW801 is set to the PWR SAVER (STAND BY for VK-C800E) position, 9V is connected to P212 pin 8 via R290, and becomes the powersave signal. At the same time, 9V is applied to IC221 pin 13 via R290, and changes the comparator output from 9V to 0V.

5-12. Timing chart

The signal wave timing chart of VK-C800 is as follows.
Fig. 5-31 shows NTSC (H) and Fig. 5-32, NTSC (V).
Fig. 5-33 shows PAL (H) and Fig. 5-34, PAL (V).

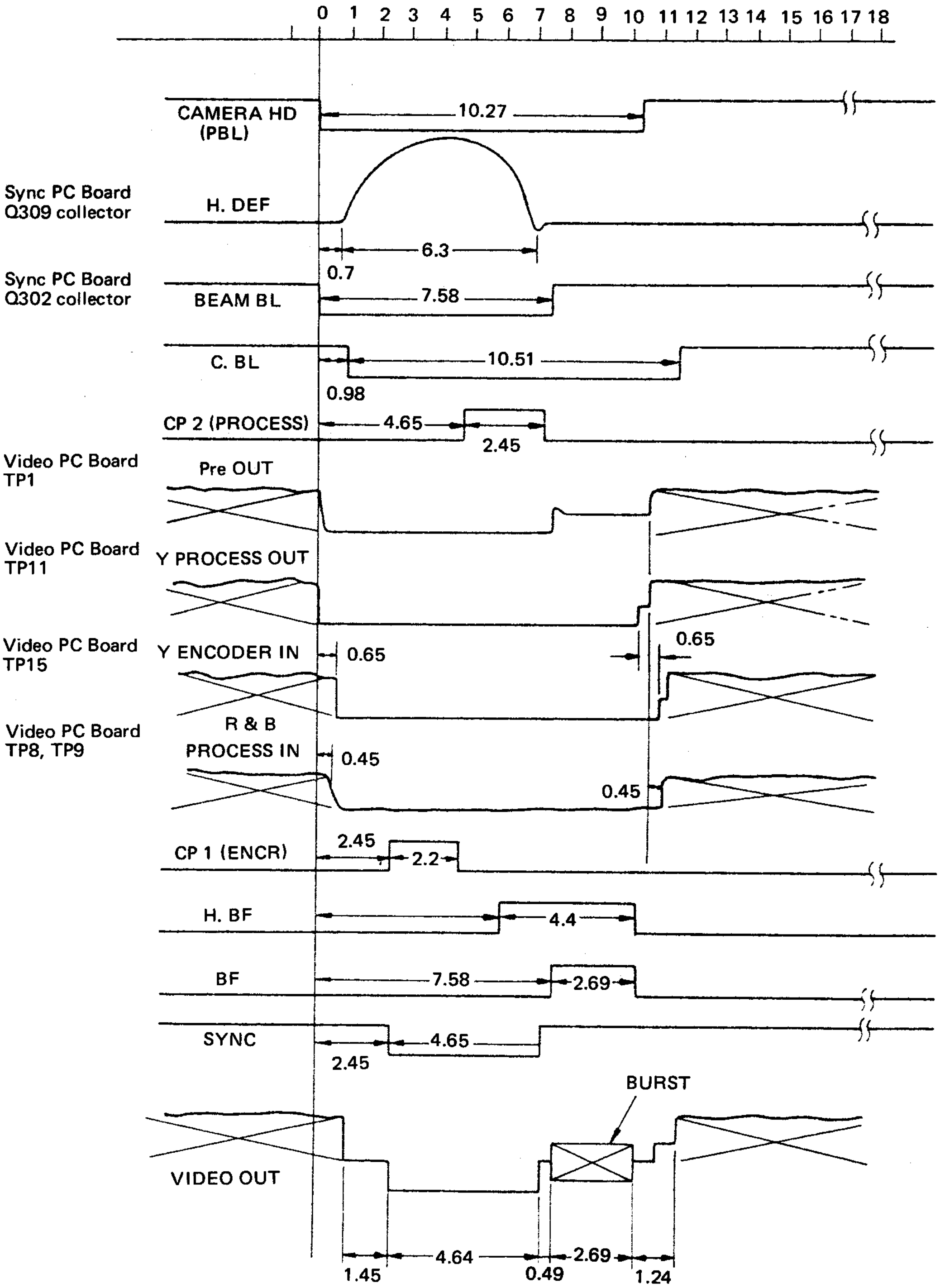

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
CAMERA HD
(PBL)
10.27
Sync PC Board
Q309 collector
H. DEF
6.3
0.7
Sync PC Board
Q302 collector
BEAM BL
7.58
C. BL
10.51
0.98
CP 2 (PROCESS)
4.65
2.45
Video PC Board
TP1
Pre OUT
Video PC Board
TP11
Y PROCESS OUT
Video PC Board
TP15
Y ENCODER IN
0.65
0.65
Video PC Board
TP8, TP9
R & B
PROCESS IN
0.45
0.45
CP 1 (ENCR)
2.45
2.2
H. BF
4.4
BF
7.58
2.69
SYNC
4.65
2.45
BURST
VIDEO OUT
1.45
4.64
0.49
2.69
1.24

Fig. 5-31 Operation timing chart (H): NTSC

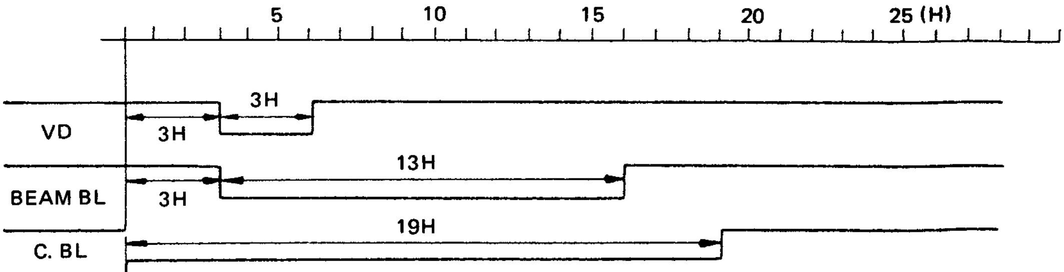

5
10
15
20
25 (H)
VD
3H
3H
BEAM BL
3H
13H
C. BL
19H

Fig. 5-32 Operation timing chart (V): NTSC

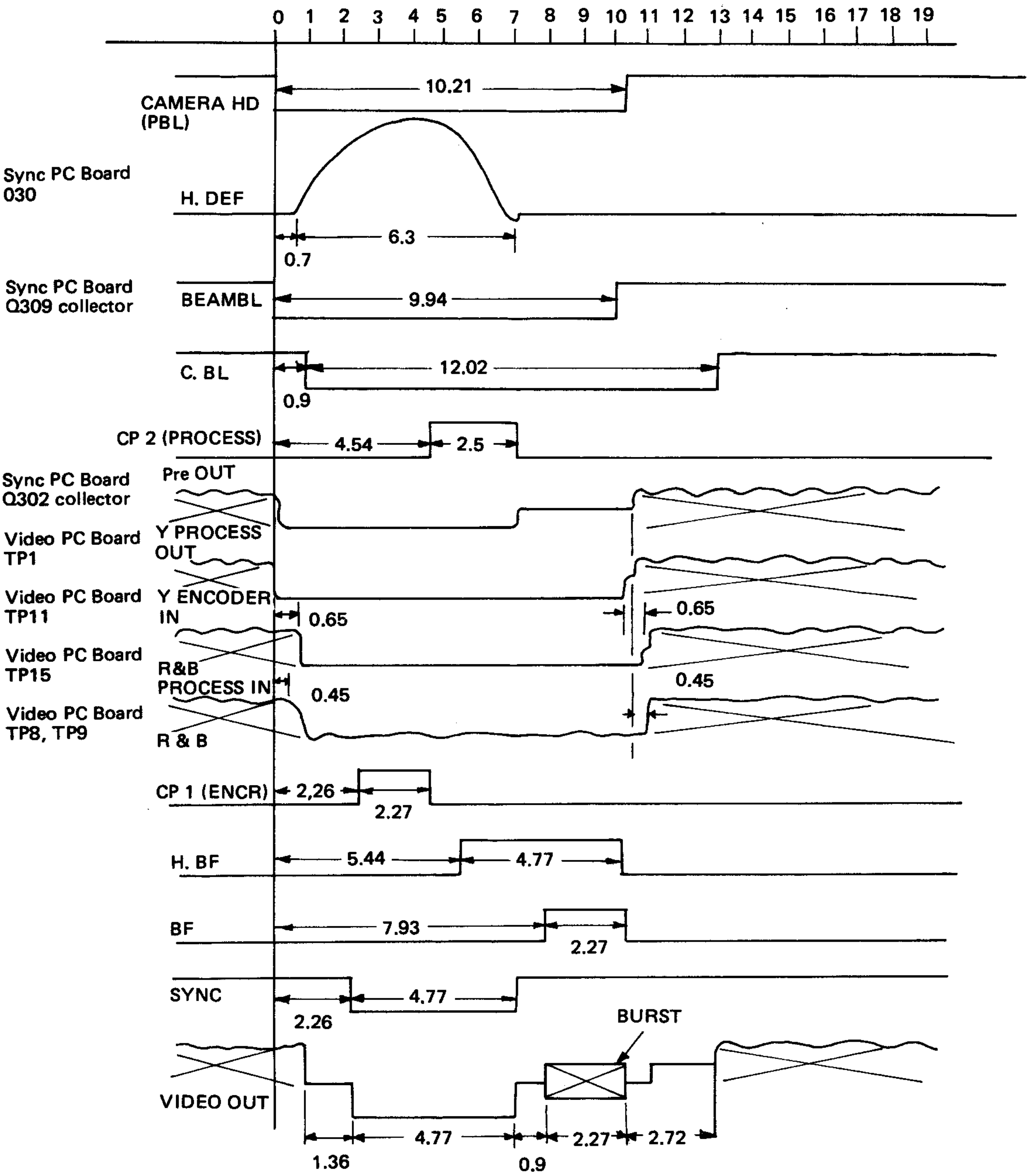

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
CAMERA HD (PBL)
10.21
Sync PC Board 030
H. DEF
6.3
0.7
Sync PC Board Q309 collector
BEAMBL
9.94
C. BL
12.02
0.9
CP 2 (PROCESS)
4.54
2.5
Sync PC Board Q302 collector
Pre OUT
Video PC Board TP1
Y PROCESS OUT
Video PC Board TP11
Y ENCODER IN
0.65
0.65
Video PC Board TP15
R&B PROCESS IN
0.45
0.45
Video PC Board TP8, TP9
R & B
CP 1 (ENCR)
2,26
2.27
H. BF
5.44
4.77
BF
7.93
2.27
SYNC
2.26
4.77
BURST
VIDEO OUT
1.36
4.77
0.9
2.27
2.72

Fig. 5-33 Operation timing chart (H): PAL

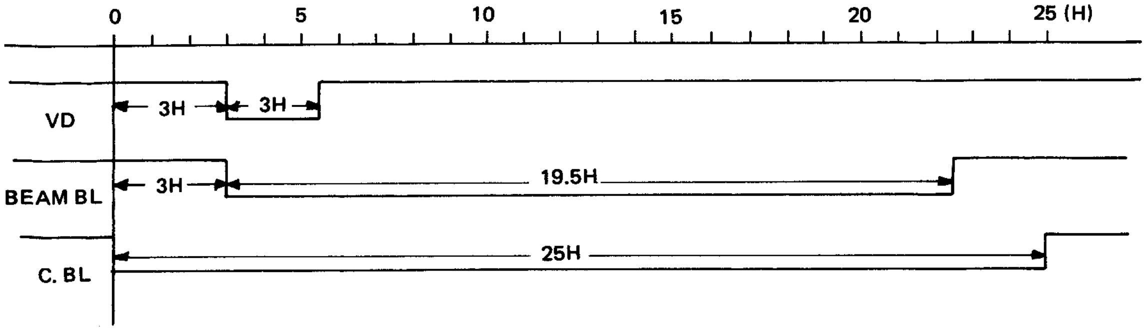

0
5
10
15
20
25 (H)
VD
3H
3H
BEAM BL
3H
19.5H
C. BL
25H

Fig. 5-34 Operation timing chart (V): NTSC

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Hitachi House, Station Road, Hayes, Middlesex UB3 4DR, England
Tel. 01 - 848 - 8787 (Service Centre : 01 - 848 - 3551)
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Sweden
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Tel. (0043222) 43937/8

HITACHI SALES AUSTRALIA Pty Ltd.
153 Keys Road, Moorabbin, Victoria 3189 Australia
Tel. 95-8722

HITACHI Ltd. TOKYO JAPAN
Head Office: 5-1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo
Tel. Tokyo (212) 1111 (80 lines)
Cable Address: "HITACHY" TOKYO
Codes: All Codes Used

VK-C800(U·C)·E TK No. 1523E TOKAI

Printed in Japan (

HITACHI
SERVICE MANUAL

TK | No. 1524E

VK-C800(U.C)·E

Technical Data

SAFETY PRECAUTION

The following precautions should be observed when servicing.

1. Since many parts in the unit have special safety-related characteristics, always use genuine Hitachi replacement parts. Especially critical parts in the power circuit block should not be replaced with other makes. Critical parts are marked with ⚠ in the schematic diagram, and circuit board diagram.
2. Before returning a repaired unit to the customer, the service technician must thoroughly test the unit to ascertain that it is completely safe to operate without danger of electrical shock.

X-RAY RADIATION

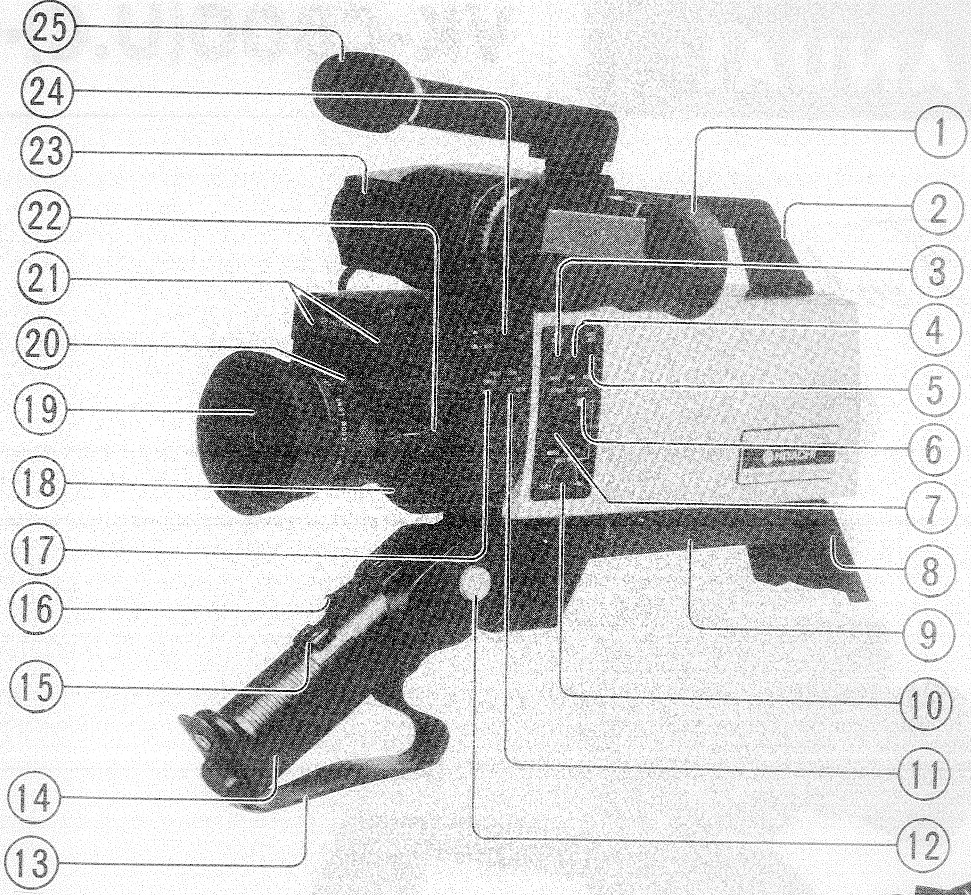
The primary source of X-ray radiation in this viewfinder is the picture tube. The tube used in this viewfinder is especially constructed to limit X-ray radiation emission. For continued X-ray radiation protection, the replacement tube must be the same type as the original, Hitachi approved one.

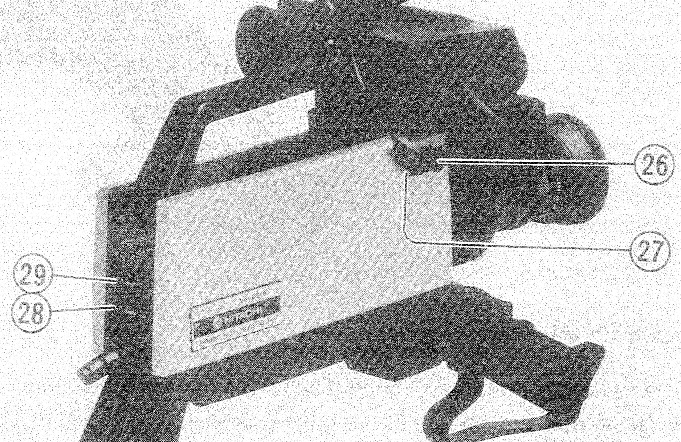
SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

April 1981 **TOKAI WORKS**

KEY TO ILLUSTRATIONS





1. Eye cap
2. Grip
3. Power save switch (Stand-by switch for VK-C800E)
4. VTR/camera select switch
5. Exposure correct switch
6. White balance check switch
7. Outdoor/indoor select switch
8. Shoulder pad
9. Shoulder pad cushion
10. White balance control knob
11. Zooming speed select switch
12. Grip release button
13. Band strap
14. Grip
15. Power zoom switch
16. Remote control switch
17. Focus select switch "AUTO" or "MAN"
18. Zoom lever
19. Zoom lens
20. Focus adjust ring
21. Rangefinder window
22. Zooming ring
23. Electronic viewfinder
24. Auto iris switch
25. Boom microphone
26. Electronic viewfinder connection terminal
27. Boom microphone connection terminal
28. External microphone jack
29. Earphone jack

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SPECIFICATIONS

System:	Uni-frequency separation system
Signal type:	VK-C-800 (U.C): Based on NTSC system
	VK-C800E: Based on PAL system
Camera tube:	VK-C800 (U.C): 2/3" SATICON (H9374A or equivalent)
	VK-C800E: 2/3" SATICON (H4115 or equivalent)
Synchronization system:	Internal synchronization
Number of scanning lines:	525 lines 2:1 interlace
Video output:	1 Vp-p 75Ω (Unbalanced)
Video S/N ratio:	46 dB or more
Standard object luminance:	500 lux
Minimum luminance required:	50 lux
Build-in microphone:	Uni-directivity electret condenser microphone
External mic input:	−67dB, high impedance
Audio line output:	−20dB, low impedance
Lens (accessory):	F1.4, f = 12.5−75mm zoom (x6)
Lens mount:	Special mount (with auto focus, auto iris power zoom, macro mechanism)
Dia. of filter screw:	52mm, thread pitch 0.75mm
View finder:	Electronic viewfinder system
	Cathode ray tube: 1.5" cathode ray tube
	Suitable earphone: Magnetic earphone (8Ω)
	Video input: 1 Vp-p, 75Ω (Unbalanced)
	Display function: Recording, quantity of light, battery, white balance
	Audio input: 0dB, high impedance
	Audio output: 5mW
Color temperature control:	From tungsten bulb illumination to cloudy weather (color filter concurrently used)
Automatic sensitivity control range:	50 – 100,000 lux
Power voltage	DC12V
Power consumption:	9.5W (When Focus select switch is set to "MAN")
Dimensions:	7-7/8"(W) x 10-5/8"(H) x 16-3/4"(D)
	(200 x 270 x 425mm)
	(Electric viewfinder and attaches mic included. Grip: horizontal)
Weight	6.83 lbs. (3.1kg) (Electronic viewfinder, attached microphone included)
Accessories:	Electronic viewfinder x 1
	Boom microphone x 1

DISASSEMBLY

Disassembling camera

Disassemble camera after removing the microphone and viewfinder.

1. Side cover

Left cover

1. Loosen 2 screws
2. Remove 1 screw.
3. Remove the side cover in the direction of the arrow.

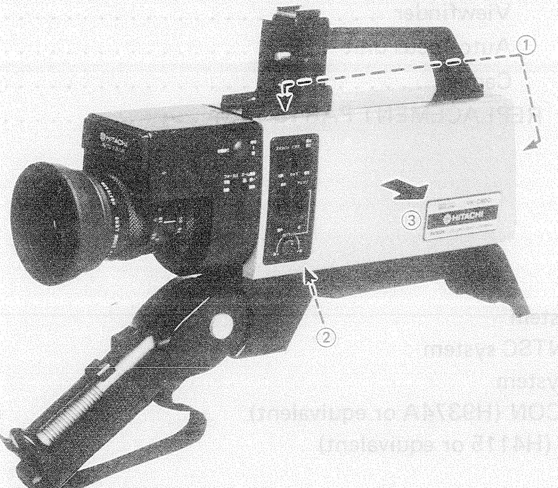


Fig. 1

Detach the right cover by the same procedure.

2. Video PC Board

4. 2 screws

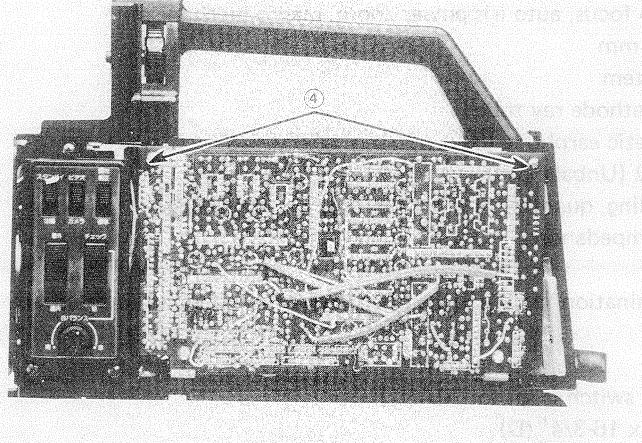


Fig. 2

3. Sync PC Board

5. 2 screws

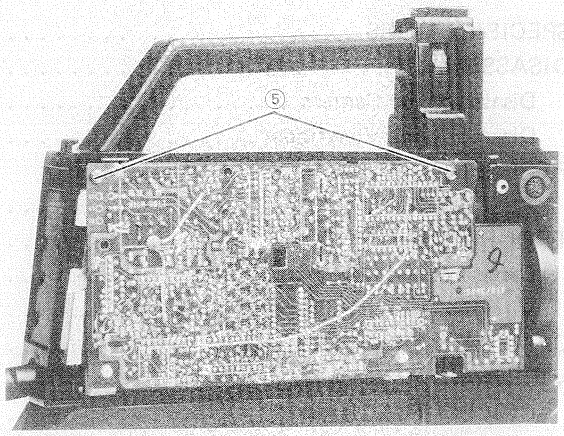


Fig. 3

4. Pre-amp PC Board

6. Remove connector bracket fixing screw.
7. Remove the shield plate of the PC Board in the direction of the arrow.
8. Unsolder the lead wires.
9. Remove 2 PC Board fixing screws.
10. Remove Connector P101.

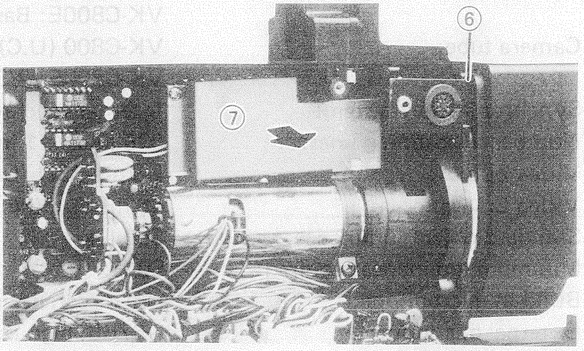


Fig. 4

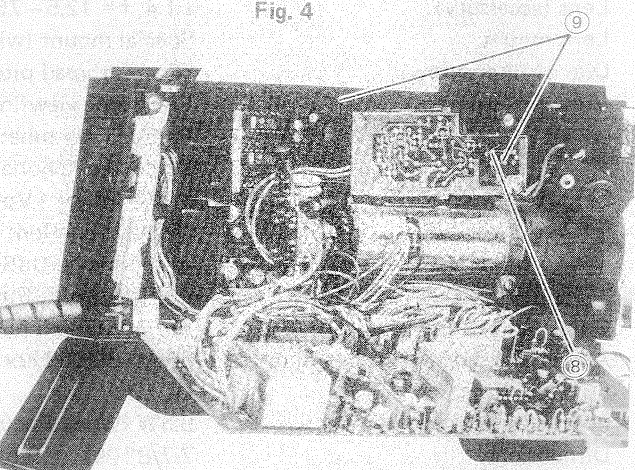


Fig.5

5. Grip

11. 3 screws

Move the grip forward after removing the screws, and remove 3 connectors inside.

Note: Be careful not to hold wires during assembly.

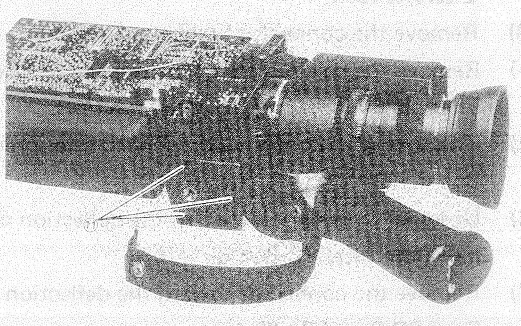


Fig. 6

6. Trigger PC Board

12. Remove the band strap adjusting screws.

13. 3 screws

14. 1 screw

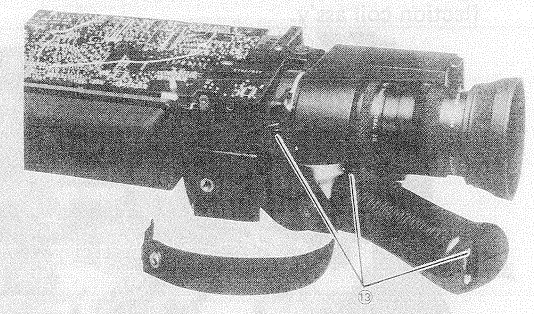


Fig. 7

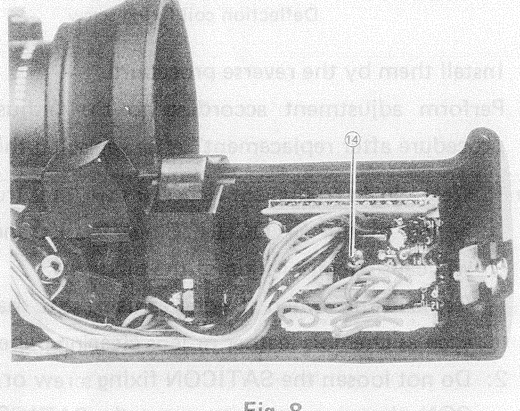


Fig. 8

7. Operation panel

Set the INDOOR/OUTDOOR select switch to "OUTDOOR", and the white balance check switch, to "CHECK"

15. 3 screws

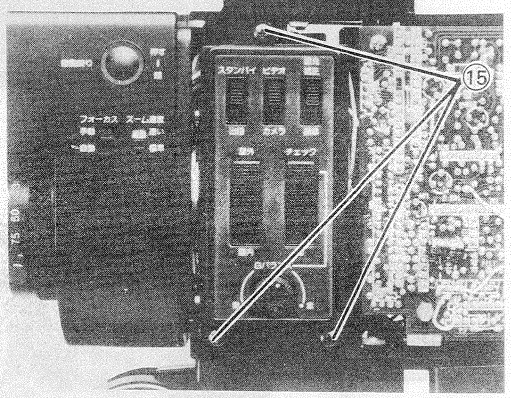


Fig. 9

8. Auto-focus cover

16. 6 screws

Remove the left cover, right cover and grip first when removing the auto-focus cover.

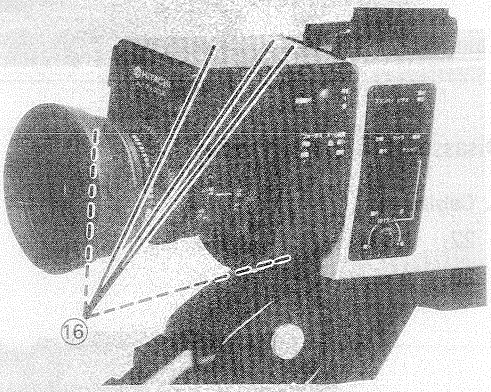


Fig. 10

9. Auto-focus PC Board

17. 3 screws

18. 2 soldered sections

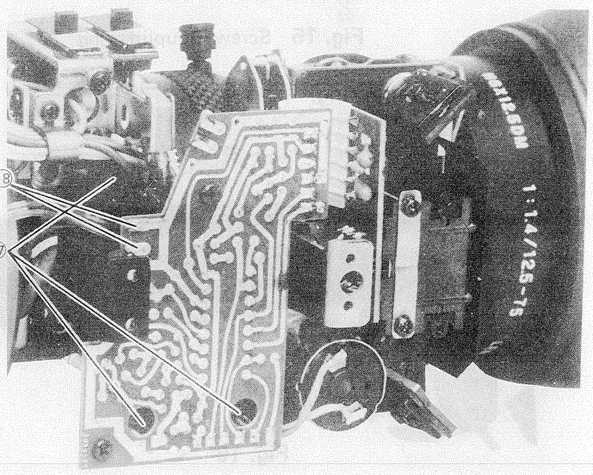


Fig. 11

10. Lens

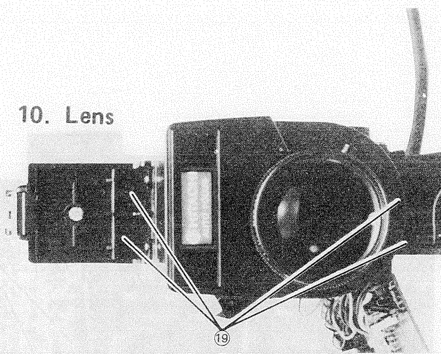


Fig. 12

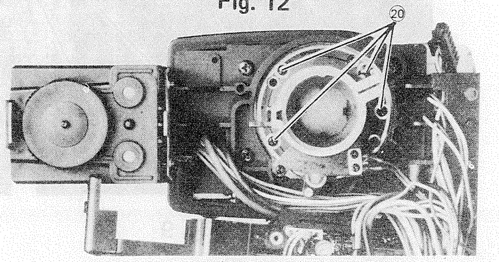


Fig. 13

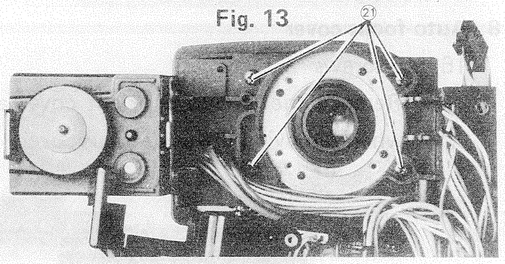


Fig. 14

Disassembling viewfinder

1. **Cabinet B**

22. Loosen the coupling ring.
23. 2 screws

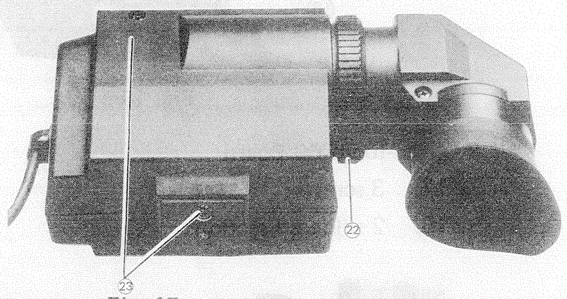


Fig. 15 Screw Boupling ring

2. **CRT**

Move the coupling ring.

24. 2 screws

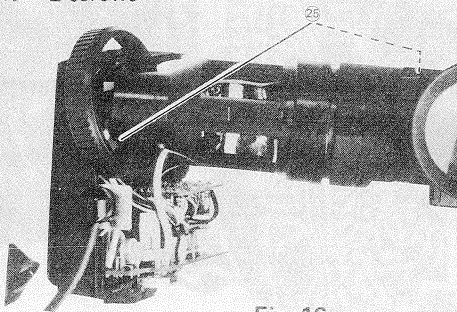


Fig. 16

(Remove the socket, CRT rubber protector and anode cap)

Replacing SATICON/deflection coil ass'y

Cut off the power first

1) Remove the right and left covers.
Remove screw and loosen 2 screws each.
2) Open the sync PC Board and video PC Board.
2 screws each.
3) Remove the connector bracket. 1 screw
4) Remove the shield plate of the pre-amp PC Board.
The shield plate is not fixed with screws.
5) Unsolder the target leads soldered to pre-amp PC Board.
6) Unsolder 4 leads soldered to the deflection coil to remove the filter PC Board.
7) Remove the connector toward the deflection coil.
Sync PC Board P306
8) Loosen deflection coil fixing screw and remove the SATICON/deflection coil ass'y in the direction of the arrow. Be careful of the target leads at that time. The SATICON is inserted into the deflection coil ass'y, so the SATICON is removed together with the deflection coil ass'y.

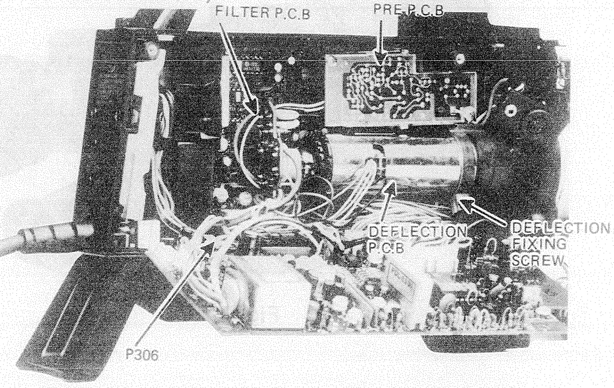


Fig. 17 Fi Filter PC Board Deflection coil Deflection coil fixing screw

9) Install them by the reverse procedure.
10) Perform adjustment according to the "adjustment procedure after replacement" after replacing them.

Note 1: Wear gloves to prevent finger or dust, etc. from adhering to the SATICON. Finger marks and dust will cause deterioration of the picture.
Remove dirt when it adheres using soft materials such as chamois leather or lens cleaning paper, etc.

2: Do not loosen the SATICON fixing screw or SATICON clamping screw to move the SATICON because the installation angle and alignment of the SATICON/deflection coil ass'y have been adjusted before delivery. Color unevenness, etc. may appear when it is moved.
Do not move the magnet ring; it reduces focusing accuracy.

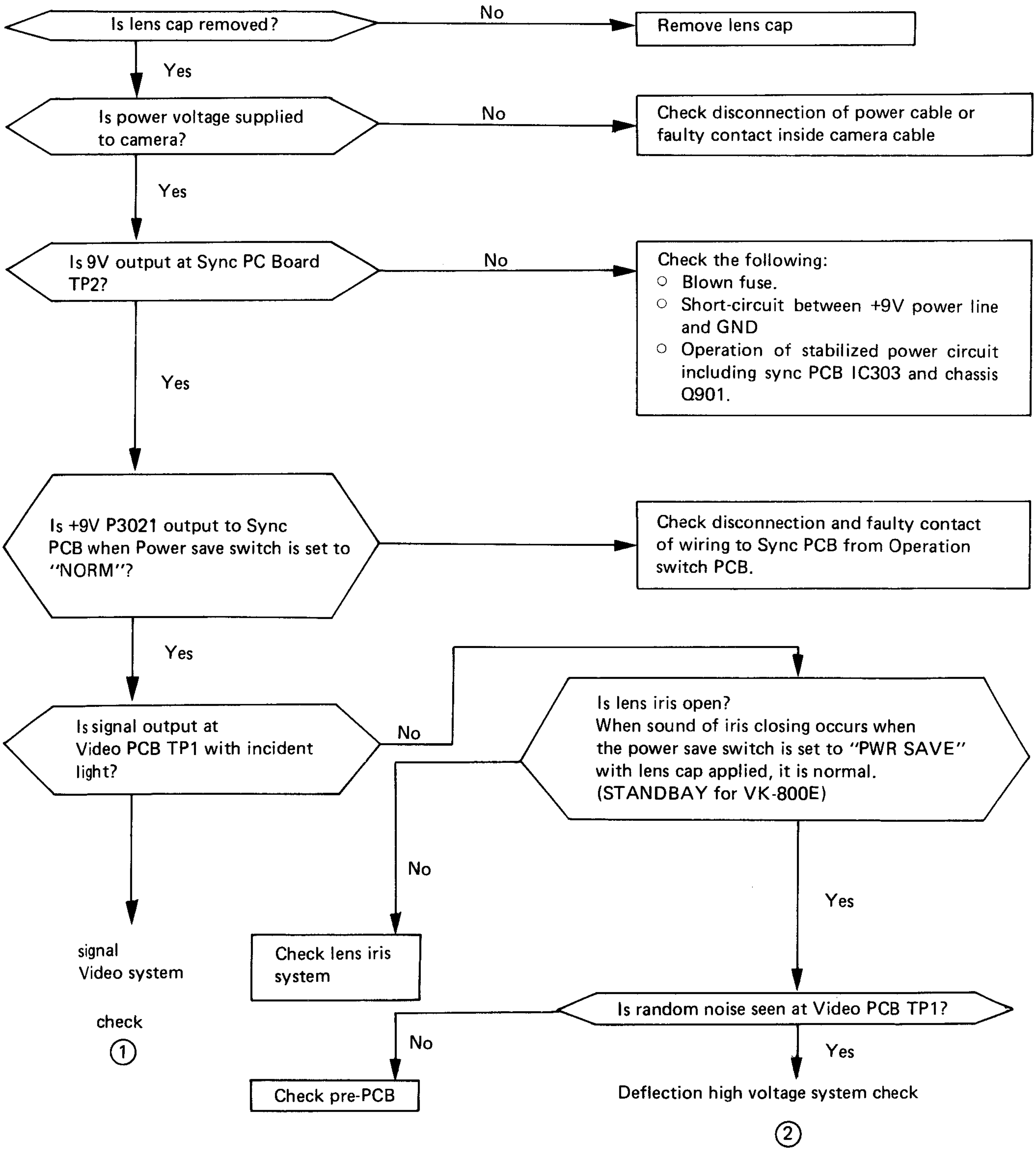
TROUBLESHOOTING

Make sure the following 2 items before checking the camera or viewfinder.

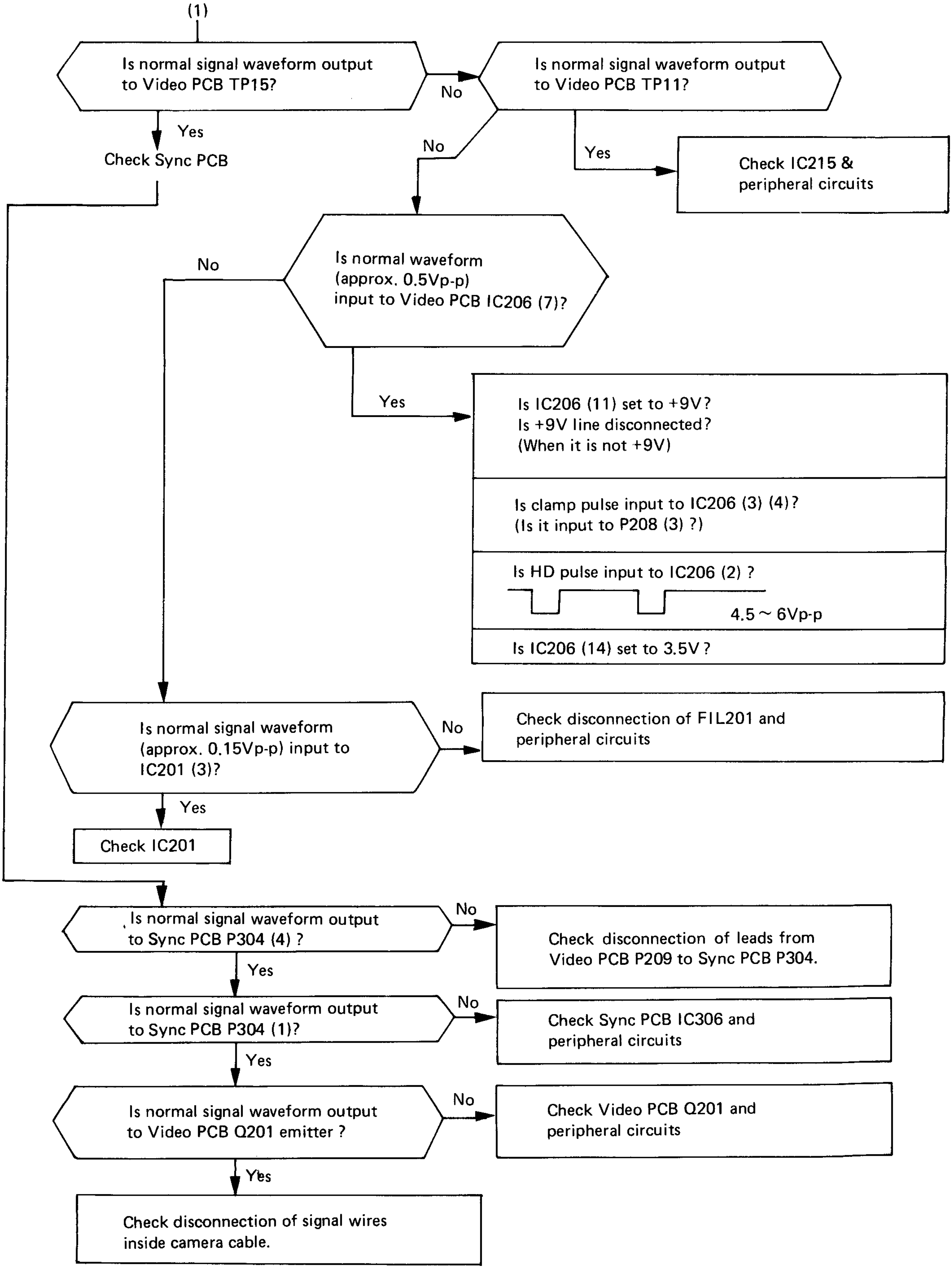
1) Connection between equipment.
   Termination conditions, cables, etc. operation switch positions, etc.
2) Input power voltage
   Camera supply voltage

Camera check flowchart

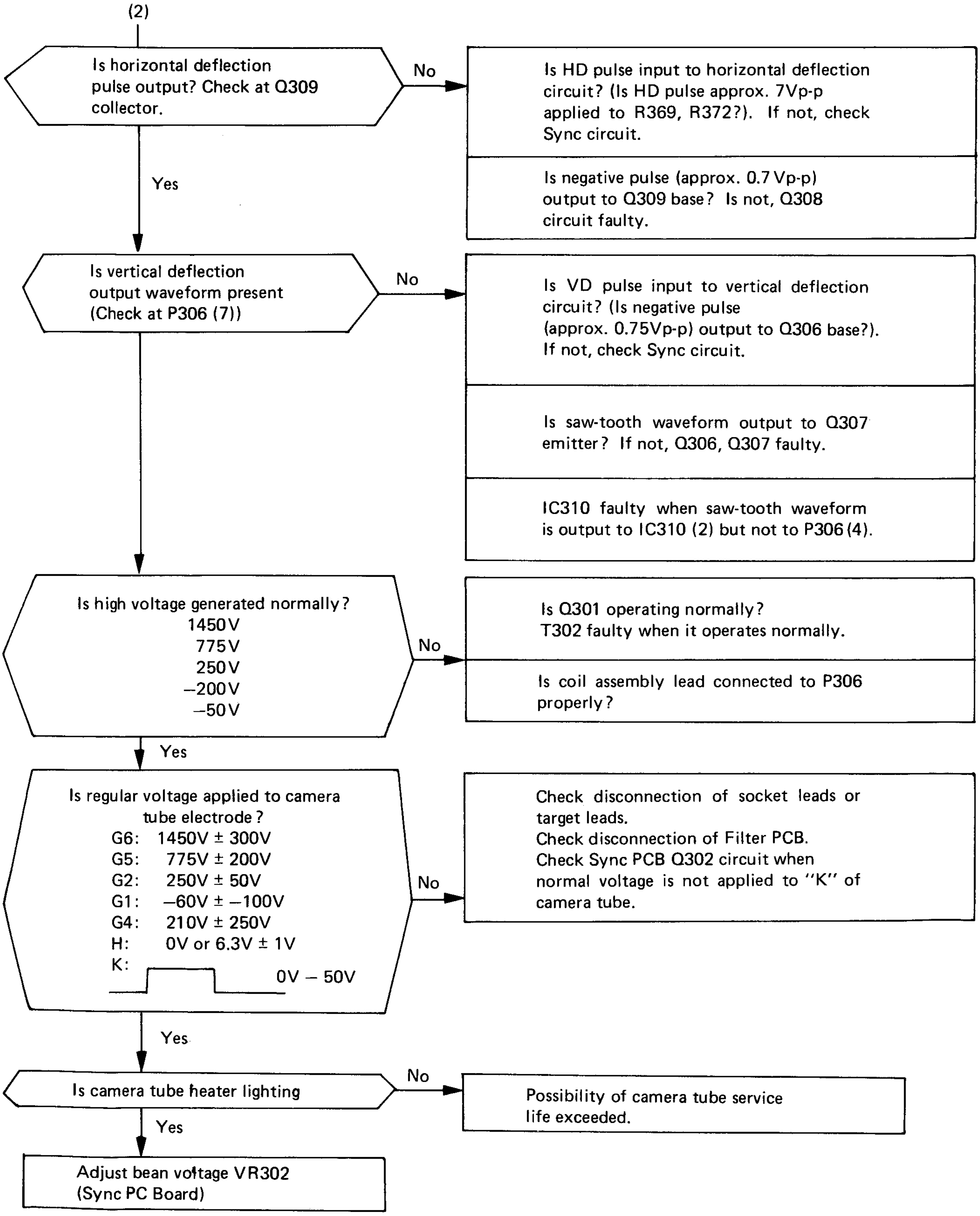
1) Picture does not appear

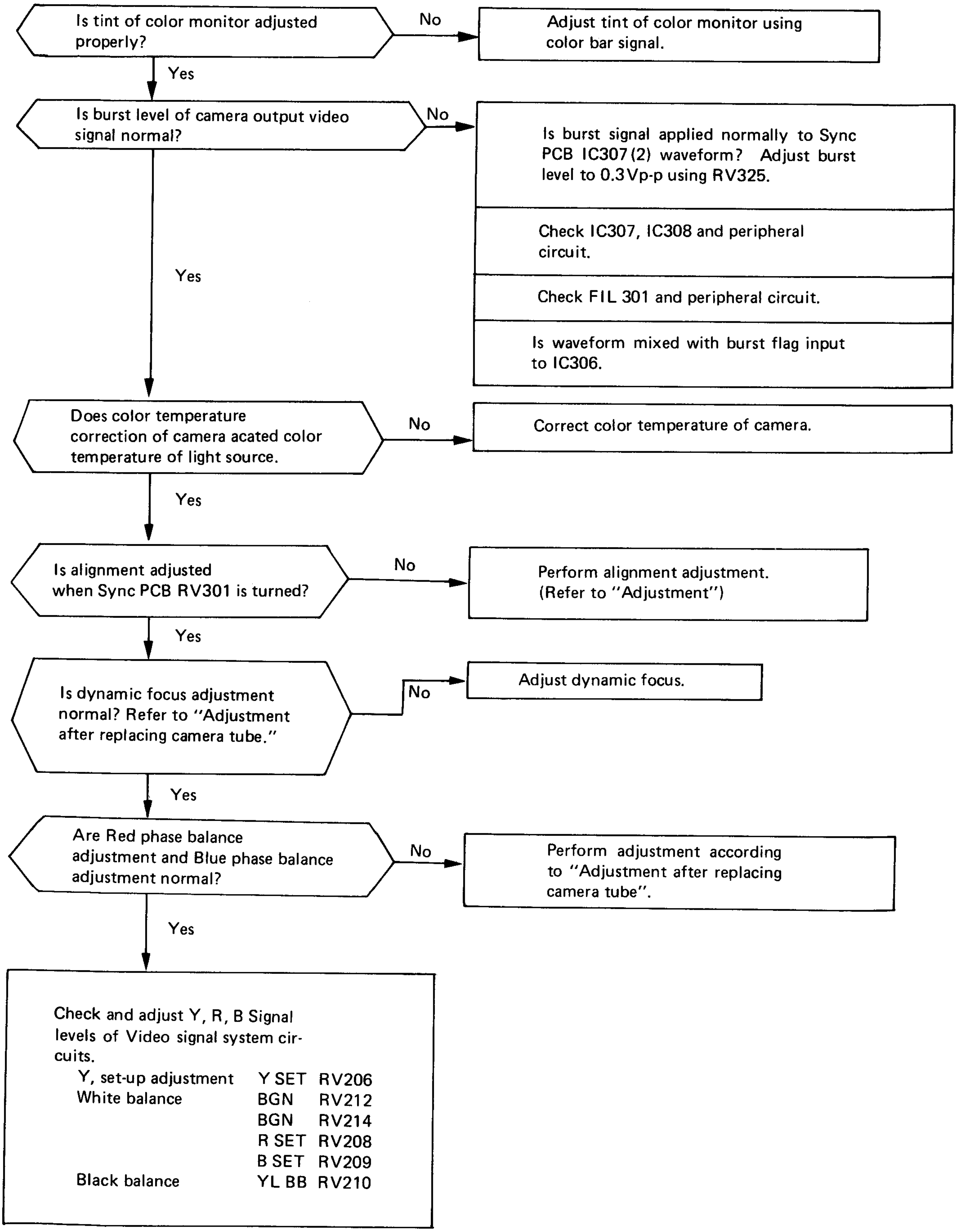

Is lens cap removed?
No
Remove lens cap
Yes
Is power voltage supplied to camera?
No
Check disconnection of power cable or faulty contact inside camera cable
Yes
Is 9V output at Sync PC Board TP2?
No
Check the following:
○ Blown fuse.
○ Short-circuit between +9V power line and GND
○ Operation of stabilized power circuit including sync PCB IC303 and chassis Q901.
Yes
Is +9V P3021 output to Sync PCB when Power save switch is set to "NORM"?
Check disconnection and faulty contact of wiring to Sync PCB from Operation switch PCB.
Yes
Is signal output at Video PCB TP1 with incident light?
No
Is lens iris open? When sound of iris closing occurs when the power save switch is set to "PWR SAVE" with lens cap applied, it is normal. (STANDBAY for VK-800E)
No
Check lens iris system
Yes
signal Video system check ①
Is random noise seen at Video PCB TP1?
No
Check pre-PCB
Yes
Deflection high voltage system check ②

Video signal system check


(1)
Is normal signal waveform output to Video PCB TP15?
Yes
Check Sync PCB
No
Is normal signal waveform output to Video PCB TP11?
Yes
Check IC215 & peripheral circuits
No
Is normal waveform (approx. 0.5Vp-p) input to Video PCB IC206 (7)?
No
Yes
Is IC206 (11) set to +9V?
Is +9V line disconnected?
(When it is not +9V)
Is clamp pulse input to IC206 (3) (4)?
(Is it input to P208 (3) ?)
Is HD pulse input to IC206 (2) ?
4.5 ~ 6Vp-p
Is IC206 (14) set to 3.5V ?
Is normal signal waveform (approx. 0.15Vp-p) input to IC201 (3)?
No
Check disconnection of FIL201 and peripheral circuits
Yes
Check IC201
Is normal signal waveform output to Sync PCB P304 (4) ?
No
Check disconnection of leads from Video PCB P209 to Sync PCB P304.
Yes
Is normal signal waveform output to Sync PCB P304 (1)?
No
Check Sync PCB IC306 and peripheral circuits
Yes
Is normal signal waveform output to Video PCB Q201 emitter ?
No
Check Video PCB Q201 and peripheral circuits
Yes
Check disconnection of signal wires inside camera cable.

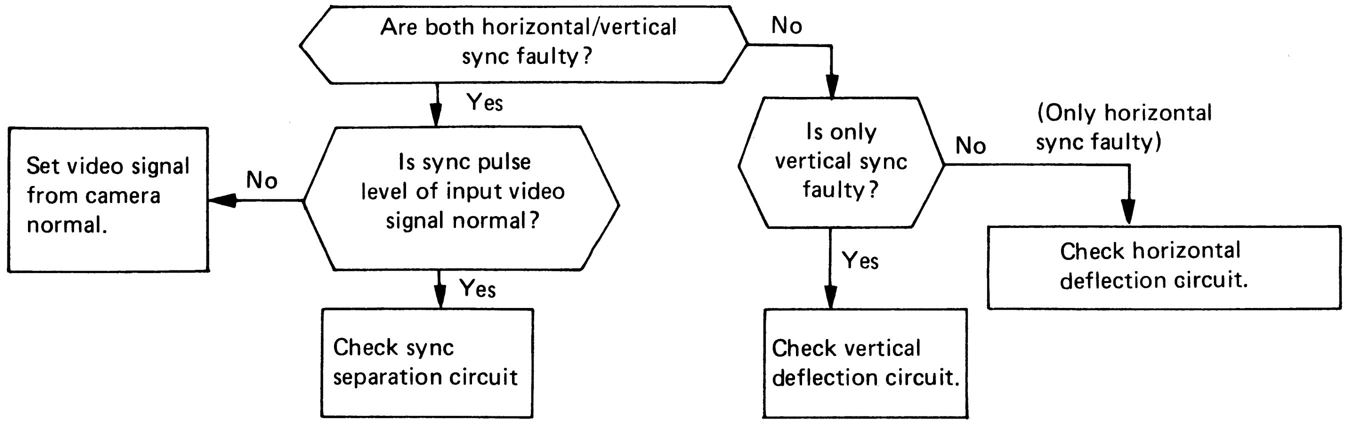
Deflection high voltage system check


(2)
Is horizontal deflection pulse output? Check at Q309 collector.
No
Is HD pulse input to horizontal deflection circuit? (Is HD pulse approx. 7Vp-p applied to R369, R372?). If not, check Sync circuit.
Is negative pulse (approx. 0.7 Vp-p) output to Q309 base? Is not, Q308 circuit faulty.
Yes
Is vertical deflection output waveform present (Check at P306 (7))
No
Is VD pulse input to vertical deflection circuit? (Is negative pulse (approx. 0.75Vp-p) output to Q306 base?). If not, check Sync circuit.
Is saw-tooth waveform output to Q307 emitter? If not, Q306, Q307 faulty.
IC310 faulty when saw-tooth waveform is output to IC310 (2) but not to P306 (4).
Is high voltage generated normally?
1450V
775V
250V
–200V
–50V
No
Is Q301 operating normally?
T302 faulty when it operates normally.
Is coil assembly lead connected to P306 properly?
Yes
Is regular voltage applied to camera tube electrode?
G6: 1450V ± 300V
G5: 775V ± 200V
G2: 250V ± 50V
G1: –60V ± –100V
G4: 210V ± 250V
H: 0V or 6.3V ± 1V
K:
0V – 50V
No
Check disconnection of socket leads or target leads.
Check disconnection of Filter PCB.
Check Sync PCB Q302 circuit when normal voltage is not applied to "K" of camera tube.
Yes
Is camera tube heater lighting
No
Possibility of camera tube service life exceeded.
Yes
Adjust bean voltage VR302
(Sync PC Board)

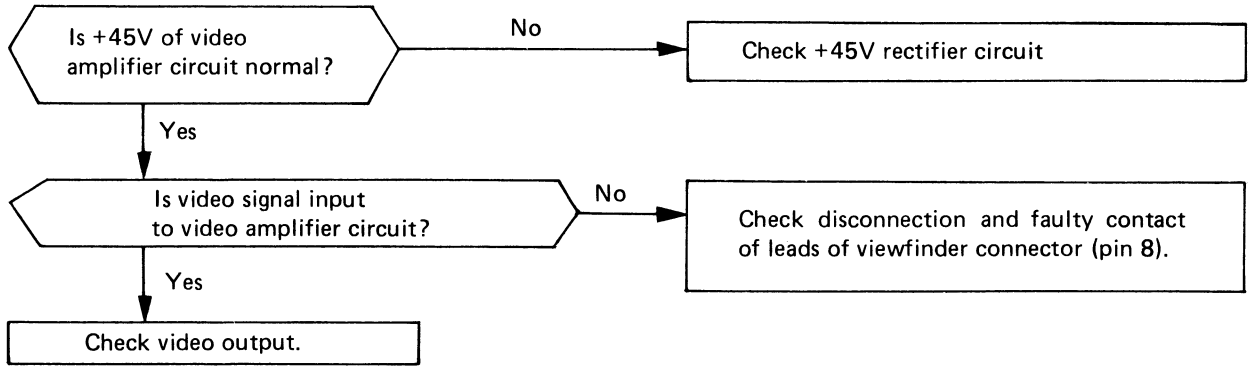

Is tint of color monitor adjusted properly?
No
Adjust tint of color monitor using color bar signal.
Yes
Is burst level of camera output video signal normal?
No
Is burst signal applied normally to Sync PCB IC307(2) waveform? Adjust burst level to 0.3Vp-p using RV325.
Check IC307, IC308 and peripheral circuit.
Check FIL 301 and peripheral circuit.
Is waveform mixed with burst flag input to IC306.
Yes
Does color temperature correction of camera acated color temperature of light source.
No
Correct color temperature of camera.
Yes
Is alignment adjusted when Sync PCB RV301 is turned?
No
Perform alignment adjustment. (Refer to "Adjustment")
Yes
Is dynamic focus adjustment normal? Refer to "Adjustment after replacing camera tube."
No
Adjust dynamic focus.
Yes
Are Red phase balance adjustment and Blue phase balance adjustment normal?
No
Perform adjustment according to "Adjustment after replacing camera tube".
Yes
Check and adjust Y, R, B Signal levels of Video signal system circuits.
Y, set-up adjustment Y SET RV206
White balance BGN RV212
BGN RV214
R SET RV208
B SET RV209
Black balance YL BB RV210

Viewfinder check flowchart

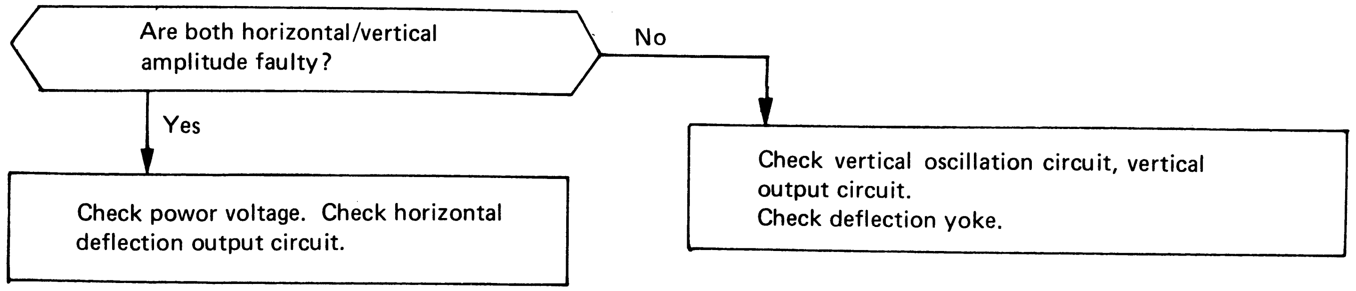
1) Synchronization cannot be obtained.


Are both horizontal/vertical sync faulty?
No
Yes
Is only vertical sync faulty?
No
(Only horizontal sync faulty)
Set video signal from camera normal.
No
Is sync pulse level of input video signal normal?
Yes
Check horizontal deflection circuit.
Yes
Check sync separation circuit
Check vertical deflection circuit.

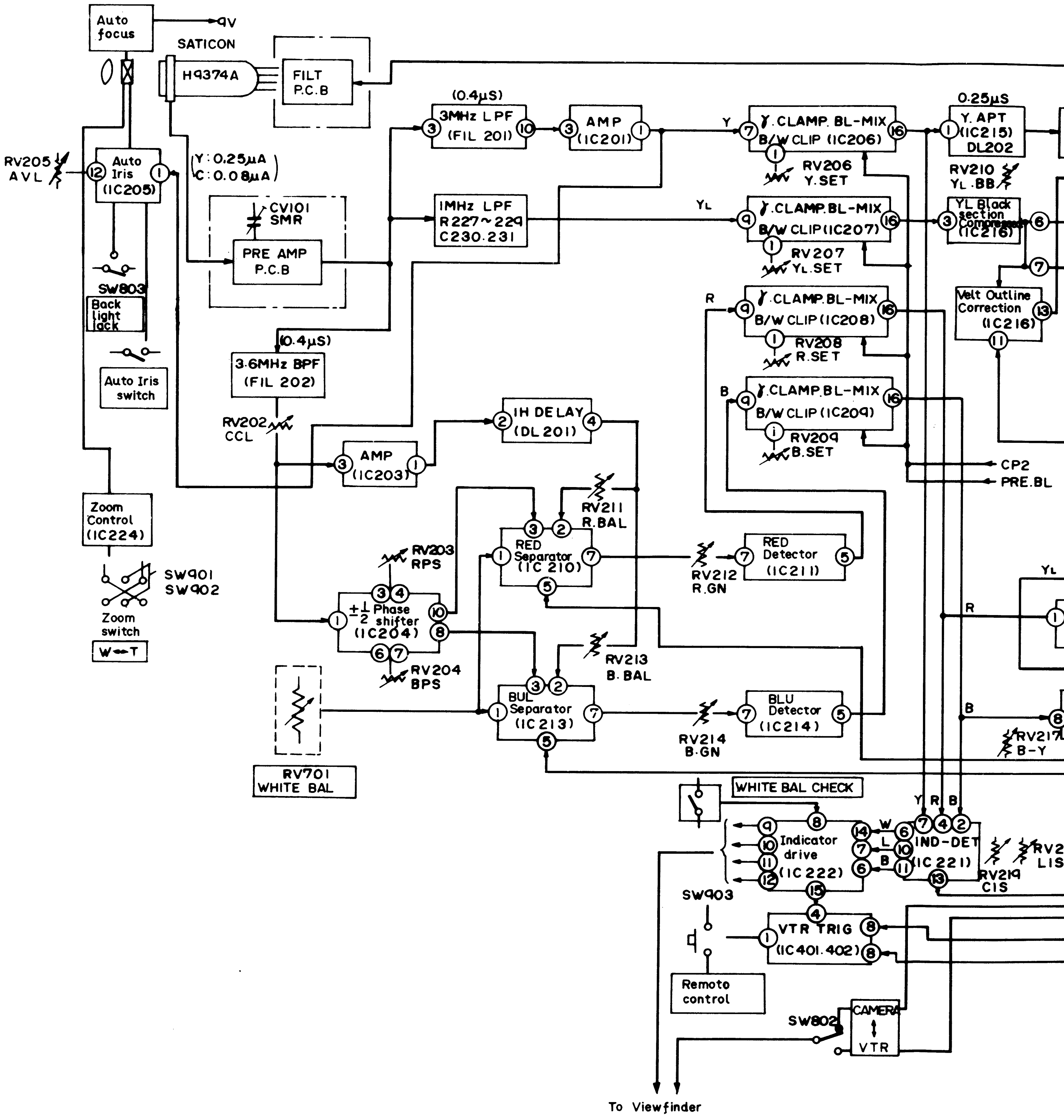
2) Picture does not appear


Is +45V of video amplifier circuit normal?
No
Check +45V rectifier circuit
Yes
Is video signal input to video amplifier circuit?
No
Check disconnection and faulty contact of leads of viewfinder connector (pin 8).
Yes
Check video output.

3) Amplitude faulty


Are both horizontal/vertical amplitude faulty?
No
Yes
Check vertical oscillation circuit, vertical output circuit.
Check deflection yoke.
Check powor voltage. Check horizontal deflection output circuit.

CAMERA BLOCK DIAGRAM


Auto focus
9V
SATICON
H9374A
FILT P.C.B
RV205 AVL
Auto Iris (IC205)
(Y: 0.25μA C: 0.08μA)
CV101 SMR
PRE AMP P.C.B
SW803
Back light lock
Auto Iris switch
(0.4μS)
3MHz LPF (FIL 201)
AMP (IC201)
1MHz LPF R227~229 C230.231
(0.4μS)
3.6MHz BPF (FIL 202)
RV202 CCL
AMP (IC203)
1H DELAY (DL 201)
Y
γ.CLAMP. BL-MIX B/W CLIP (IC206)
RV206 Y.SET
YL
γ.CLAMP. BL-MIX B/W CLIP (IC207)
RV207 YL.SET
R
γ.CLAMP. BL-MIX B/W CLIP (IC208)
RV208 R.SET
B
γ.CLAMP. BL-MIX B/W CLIP (IC209)
RV209 B.SET
0.25μS
Y. APT (IC215) DL202
RV210 YL.BB
YL Black section Compressor (IC216)
Velt Outline Correction (IC216)
CP2
PRE.BL
Zoom Control (IC224)
SW901
SW902
Zoom switch
W↔T
RV203 RPS
± 1/2 Phase shifter (IC204)
RV204 BPS
RV211 R.BAL
RED Separator (IC 210)
RV212 R.GN
RED Detector (IC211)
RV213 B.BAL
BLU Separator (IC 213)
RV214 B.GN
BLU Detector (IC214)
RV701 WHITE BAL
WHITE BAL CHECK
Y R B
Indicator drive (IC 222)
IND-DET (IC 221)
W L B
RV219 CIS
RV2 LIS
RV217 B-Y
SW903
VTR TRIG (IC401.402)
Remote control
SW802
CAMERA ↕ VTR
To Viewfinder

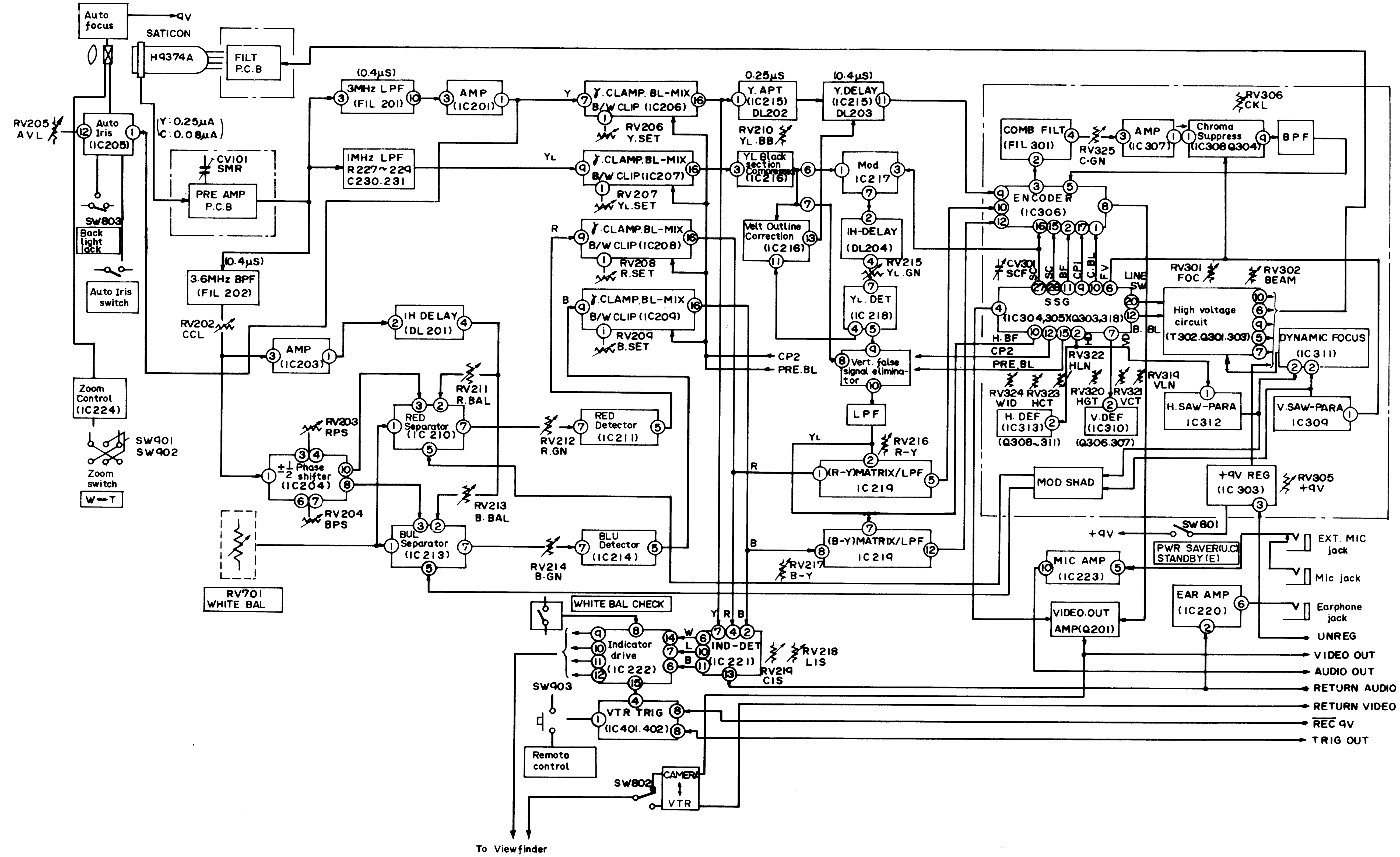
y horizontal
faulty)

eck horizontal
flection circuit.

contact
(pin 8).

it, vertical

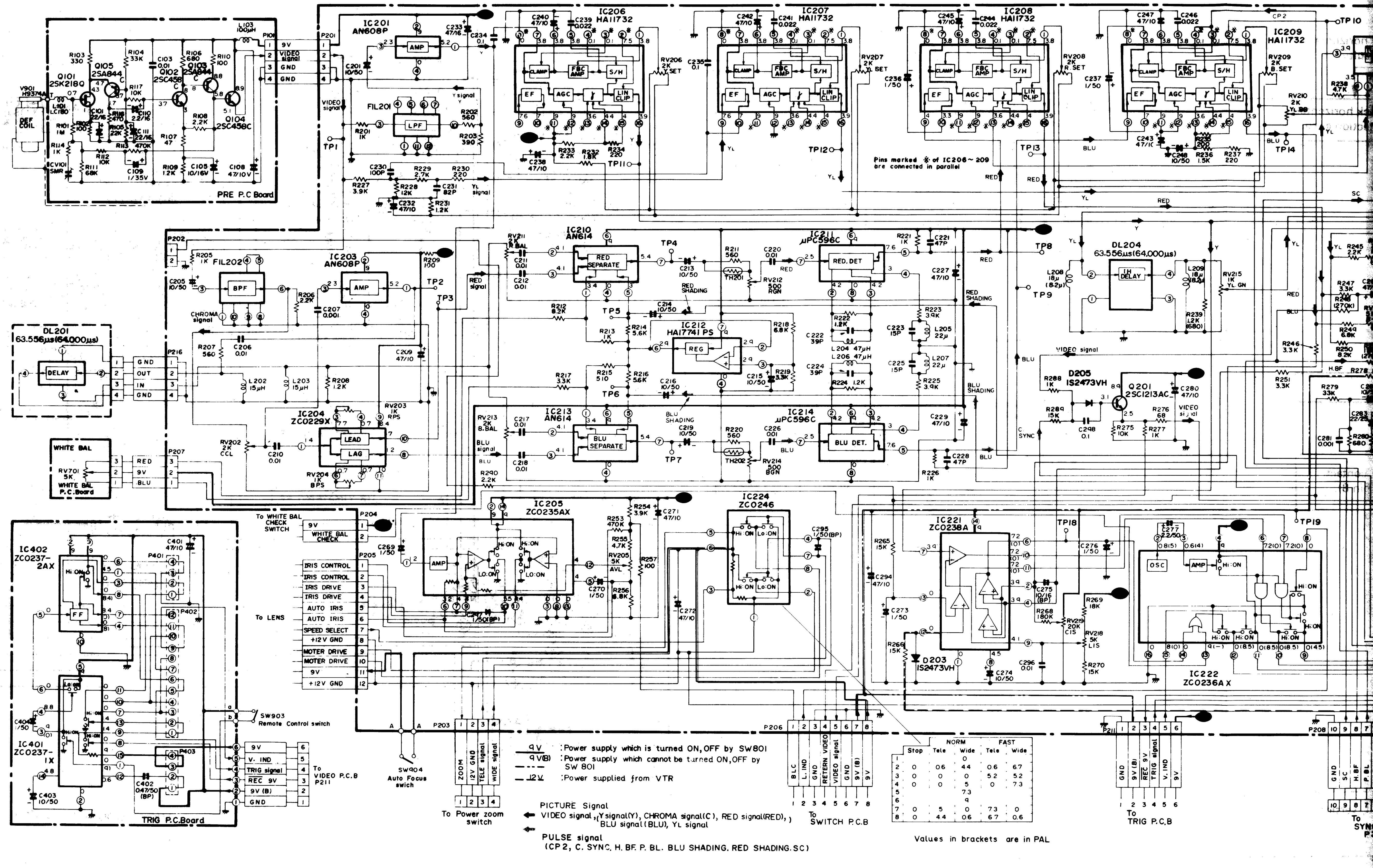
CAMERA BLOCK DIAGRAM



Auto focus
9V
SATICON
H9374A
FILT P.C.B
RV205 AVL
Auto Iris (IC205)
(Y: 0.25μA / C: 0.08μA)
CV101 SMR
PRE AMP P.C.B
SW803
Back light jack
Auto Iris switch
(0.4μS)
3MHz LPF (FIL 201)
AMP (IC201)
1MHz LPF R227~229 C230.231
(0.4μS)
3.6MHz BPF (FIL 202)
RV202 CCL
AMP (IC203)
1H DELAY (DL 201)
Zoom Control (IC224)
SW901 SW902
Zoom switch
W⟷T
RV203 RPS
±1/2 Phase shifter (IC204)
RV204 BPS
RV211 R.BAL
RED Separator (IC 210)
RV213 B.BAL
BUL Separator (IC213)
RV701 WHITE BAL
RV212 R.GN
RED Detector (IC211)
RV214 B.GN
BLU Detector (IC214)
Y
γ.CLAMP. BL-MIX B/W CLIP (IC206)
RV206 Y.SET
YL
γ.CLAMP. BL-MIX B/W CLIP (IC207)
RV207 YL.SET
R
γ.CLAMP. BL-MIX B/W CLIP (IC208)
RV208 R.SET
B
γ.CLAMP. BL-MIX B/W CLIP (IC209)
RV209 B.SET
0.25μS
Y. APT (IC215) DL202
(0.4μS)
Y. DELAY (IC215) DL203
RV210 YL.BB
YL Black section Compressor (IC216)
Velt Outline Correction (IC216)
Mod IC217
1H-DELAY (DL204)
RV215 YL.GN
YL. DET (IC 218)
Vert. false signal eliminator
CP2
PRE.BL
LPF
YL
RV216 R-Y
R
(R-Y)MATRIX/LPF IC219
B
(B-Y)MATRIX/LPF IC219
RV217 B-Y
COMB FILT (FIL 301)
RV325 C-GN
AMP (IC307)
Chroma Suppress (IC308 Q304)
BPF
RV306 CKL
ENCODER (IC306)
CV301 SCF
SC BF CP1 C.BL FV
LINE SW
SSG (IC304,305)(Q303,318)
H.BF
CP2
PRE.BL
B.BL
RV322 HLN
RV324 WID
RV323 HCT
RV320 HGT
RV321 VCT
RV319 VLN
H. DEF (IC313) (Q308~311)
V.DEF (IC310) (Q306.307)
RV301 FOC
RV302 BEAM
High voltage circuit (T302.Q301.303)
DYNAMIC FOCUS (IC311)
H.SAW-PARA IC312
V.SAW-PARA IC309
MOD SHAD
+9V REG (IC 303)
RV305 +9V
+9V
SW801
PWR SAVER(U.C) STANDBY(E)
MIC AMP (IC223)
EAR AMP (IC220)
VIDEO.OUT AMP(Q201)
EXT. MIC jack
Mic jack
Earphone jack
UNREG
VIDEO OUT
AUDIO OUT
RETURN AUDIO
RETURN VIDEO
REC 9V
TRIG OUT
WHITE BAL CHECK
Y R B
W L B
Indicator drive (IC222)
IND-DET (IC221)
RV218 LIS
RV219 CIS
SW903
VTR TRIG (IC401.402)
Remoto control
SW802
CAMERA ⟷ VTR
To Viewfinder

VK−C800 Cカメラブロック S55.9 (H)

VIDEO CIRCUIT DIAGRAM


PRE P.C Board
Q101 2SK218Q
Q105 2SA844
Q102 2SC458
Q103 2SA844
Q104 2SC458C
V901 H9374A
DEF COIL
CV101 5MR
L103 100μH
P101
P201
9V
VIDEO signal
GND
IC201 AN608P
AMP
FIL201
LPF
Y signal
TP1
IC206 HA11732
IC207 HA11732
IC208 HA11732
IC209 HA11732
CLAMP
FBC AMP
S/H
EF
AGC
LIN CLIP
RV206 2K Y SET
RV207 2K B SET
RV208 2K R SET
RV209 2K B SET
RV210 2K YL SET
TP10
TP11
TP12
TP13
TP14
Pins marked * of IC206 ~ 209 are connected in parallel
P202
FIL202
BPF
CHROMA signal
IC203 AN608P
TP2
TP3
IC210 AN614
RED SEPARATE
TP4
TP5
IC211 μPC596C
RED. DET
RV212 500 RGN
TH201
IC212 HA17741 PS
REG
TP6
IC213 AN614
BLU SEPARATE
TP7
IC214 μPC596C
BLU DET.
RV214 500 BGN
TH202
RV211 2K R.BAL
RV213 2K B.BAL
RED SHADING
BLU SHADING
DL204 63.556μs(64.000μs)
1H DELAY
TP8
TP9
RV215 YL GN
D205 1S2473VH
Q201 2SC1213AC
C.SYNC
DL201 63.556μs(64.000μs)
DELAY
P216
GND
OUT
IN
IC204 ZC0229X
LEAD
LAG
RV202 2K CCL
RV203 1K RPS
RV204 1K BPS
WHITE BAL
RV701 5K
WHITE BAL P.C.Board
P207
RED
BLU
P204
To WHITE BAL CHECK SWITCH
WHITE BAL CHECK
P205
IRIS CONTROL
IRIS DRIVE
AUTO IRIS
SPEED SELECT
+12V GND
MOTER DRIVE
To LENS
IC205 ZC0235AX
AMP
Hi:ON
Lo:ON
RV205 5K AVL
IC224 ZC0246
IC221 ZC0238A
D203 1S2473VH
RV219 20K CIS
RV218 5K LIS
TP18
TP19
IC222 ZC0236AX
OSC
IC402 ZC0237-2AX
FF
IC401 ZC0237-1X
P401
P402
P403
TRIG P.C.Board
SW903 Remote Control switch
V. IND
TRIG signal
REC 9V
9V (B)
To VIDEO P.C.B P211
SW904 Auto Focus swich
P203
ZOOM
12V GND
TELE signal
WIDE signal
To Power zoom switch
P206
BLC
L. IND
RETERN VIDEO
VIDEO signal
To SWITCH P.C.B
P211
REC 9V
To TRIG P.C.B
P208
SC
H.BF
P.BL

9V :Power supply which is turned ON,OFF by SW801

9V(B) :Power supply which cannot be turned ON,OFF by SW 801

12V :Power supplied from VTR

PICTURE Signal

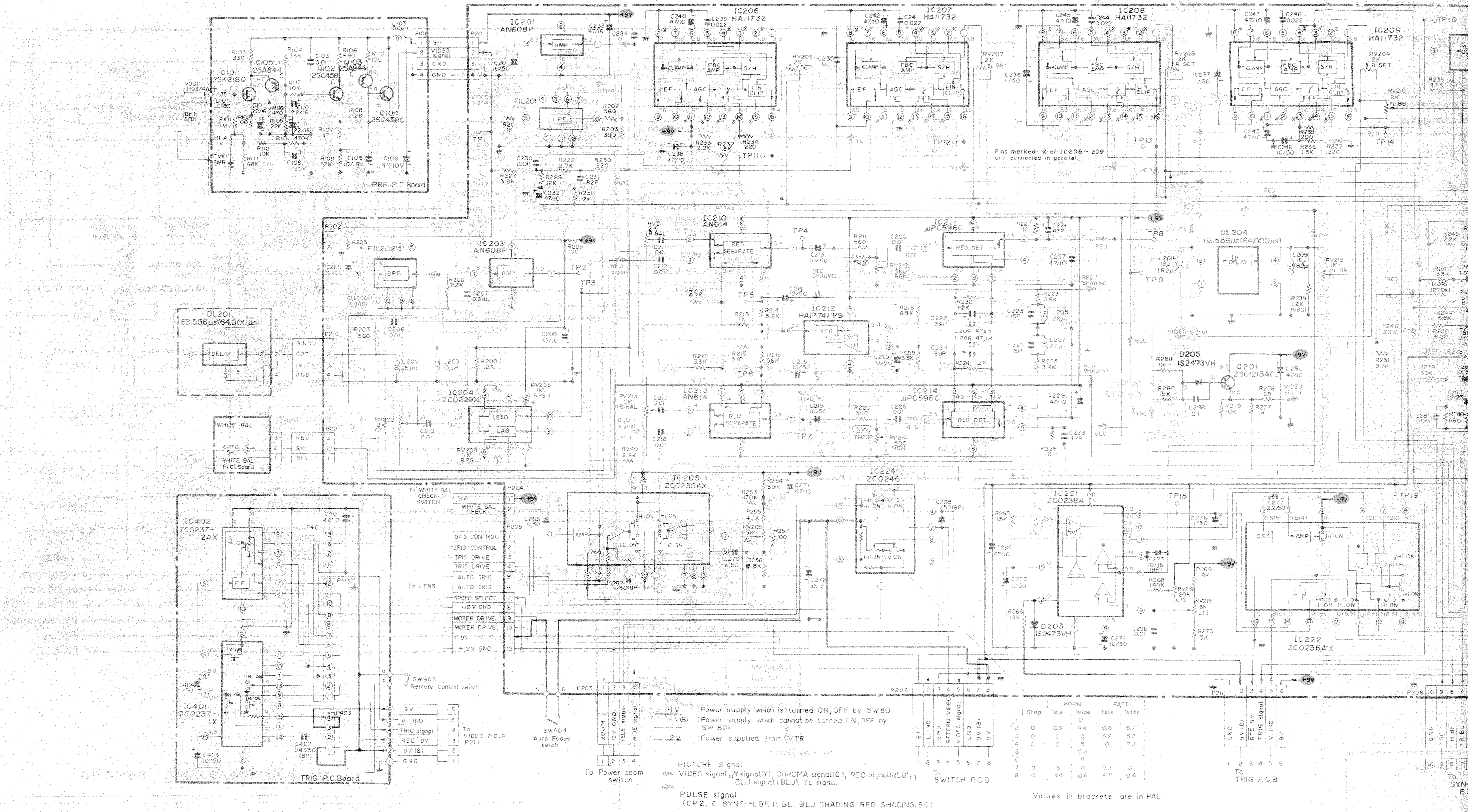
VIDEO signal, (Y signal(Y), CHROMA signal(C), RED signal(RED), BLU signal(BLU), YL signal)

PULSE signal
(CP2, C. SYNC. H. BF. P. BL. BLU SHADING. RED SHADING. SC)

	NORM			FAST	
	Stop	Tele	Wide	Tele	Wide
1			0		
2	0	0.6	4.4	0.6	6.7
3	0	0	0	5.2	5.2
4	0	0	5	0	7.3
5			7.3		
6			9		
7	0	5	0	7.3	0
8	0	4.4	0.6	6.7	0.6

Values in brackets are in PAL

VIDEO CIRCUIT DIAGRAM

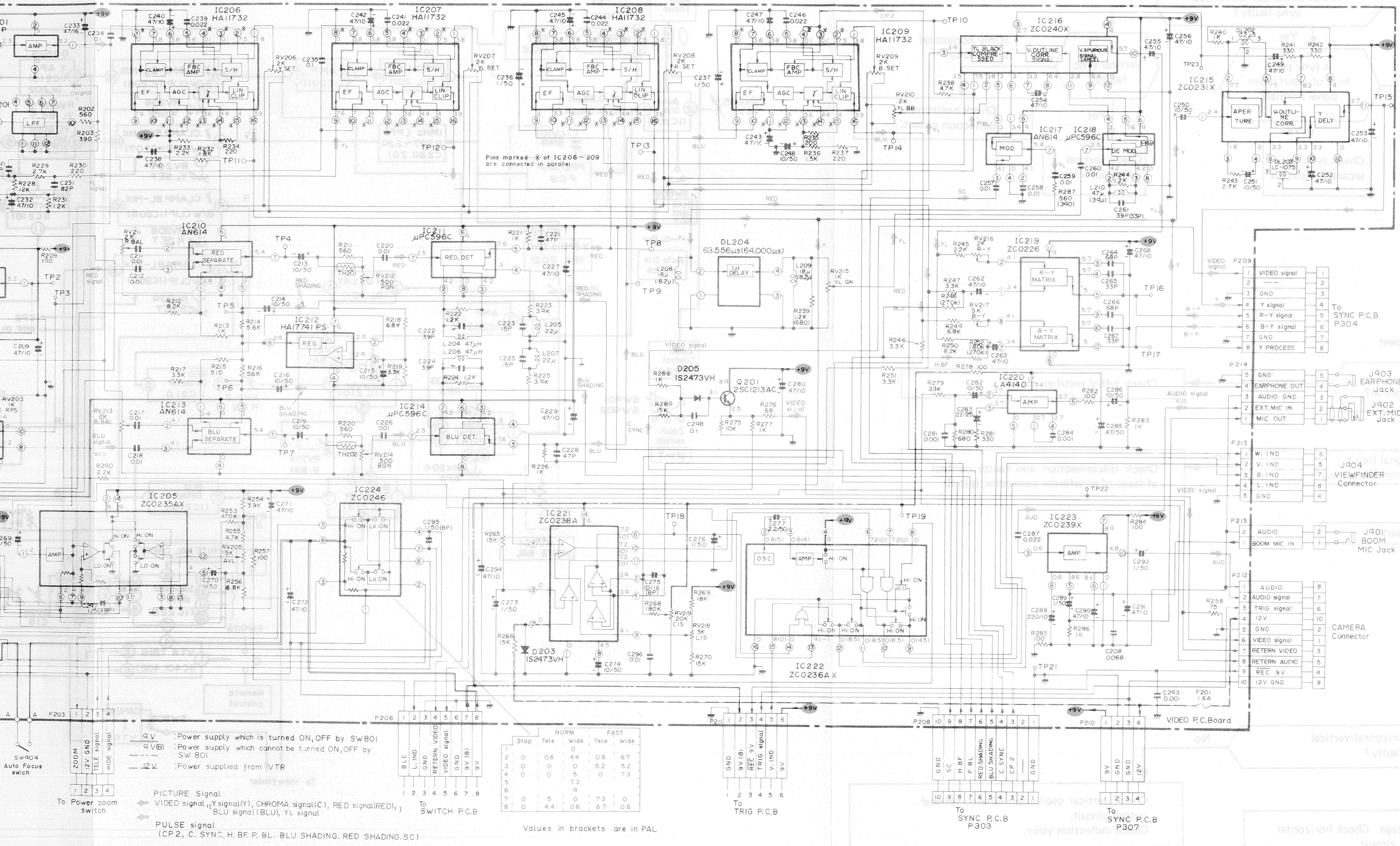

PRE P.C Board
Q101 2SK218Q
Q105 2SA844
Q102 2SC458
Q103 2SA844
Q104 2SC458C
V901 H9374A
DEF COIL
P101
VIDEO signal
9V
GND
P201
IC201 AN608P
FIL201
LPF
AMP
IC206 HA11732
IC207 HA11732
IC208 HA11732
IC209 HA11732
CLAMP
FBC AMP
S/H
EF
AGC
LIN CLIP
Pins marked ※ of IC206 ~ 209 are connected in parallel
RV206 2K G SET
RV207 2K SET
RV208 2K R SET
RV209 2K B SET
RV210 2K YL BB
TP1
TP10
TP11
TP12
TP13
TP14
P202
FIL202
BPF
CHROMA signal
IC203 AN608P
TP2
TP3
IC210 AN614
RED SEPARATE
RV211 1K R.BAL
TP4
TP5
TP6
TP7
TP8
TP9
IC211 μPC596C
RED. DET
RV212 500 RGN
IC212 HA17741PS
REG
DL204 63.556μs(64.000μs)
1H DELAY
RV215 1K YL.GN
DL201 63.556μs(64.000μs)
DELAY
P216
GND
OUT
IN
IC204 ZC0229X
LEAD
LAG
RV202 2K CCL
RV203 1K RPS
RV204 1K BPS
IC213 AN614
BLU SEPARATE
RV213 2K B.BAL
BLU signal
IC214 μPC596C
BLU DET.
RV214 500 BGN
D205 1S2473VH
Q201 2SC1213AC
VIDEO signal
C.SYNC
WHITE BAL
RV701 5K
WHITE BAL P.C.Board
P207
RED
BLU
To WHITE BAL CHECK SWITCH
WHITE BAL CHECK
P204
P205
To LENS
IRIS CONTROL
IRIS DRIVE
AUTO IRIS
SPEED SELECT
+12V GND
MOTER DRIVE
9V
IC205 ZC0235AX
Hi:ON
Lo:ON
RV205 5K AVL
IC224 ZC0246
IC221 ZC0238A
TP18
D203 1S2473VH
RV219 20K C1S
RV218 5K L1S
IC222 ZC0236AX
OSC
TP19
IC402 ZC0237-2AX
IC401 ZC0237-1X
FF
P401
P402
P403
SW903 Remote Control switch
9V
V. IND
TRIG signal
REC 9V
9V (B)
To VIDEO P.C.B P211
TRIG P.C.Board
SW904 Auto Focus swich
P203
ZOOM
12V GND
TELE signal
WIDE signal
To Power zoom switch
P206
BLC
L. IND
GND
RETERN VIDEO
VIDEO signal
To SWITCH P.C.B
P211
REC 9V
TRIG signal
To TRIG P.C.B
P208
SC
H.BF
P.BL
+9V

9V :Power supply which is turned ON, OFF by SW801
9V(B) :Power supply which cannot be turned ON, OFF by SW 801
12V :Power supplied from VTR

PICTURE Signal
VIDEO signal, (Y signal(Y), CHROMA signal(C), RED signal(RED), BLU signal(BLU), YL signal)
PULSE signal
(CP2, C. SYNC, H. BF, P. BL, BLU SHADING, RED SHADING, SC)

		NORM		FAST	
	Stop	Tele	Wide	Tele	Wide
1			0		
2	0	0.6	4.4	0.6	6.7
3	0	0	0	5.2	5.2
4	0	0	5	0	7.3
5			7.3		
6			9		
7	0	5	0	7.3	0
8	0	4.4	0.6	6.7	0.6

Values in brackets are in PAL


IC206 HA11732
IC207 HA11732
IC208 HA11732
IC209 HA11732
CLAMP
FBC AMP
S/H
EF
AGC
LIN CLIP
RV206 2K L SET
RV207 2K L SET
RV208 2K R SET
RV209 2K B SET
RV210 2K YL BB
IC216 ZC0240X
YL BLACK COMPRESSED
V. OUTLINE CORR. SIGNAL
V. SPURIOUS SIGNAL CANCEL
IC215 ZC0231X
APER TURE
V. OUTLINE CORR.
Y DELY
IC217 AN614
IC218 μPC596C
MOD
DE MOD
DL202
DL203 LC-1075
Pins marked × of IC206 ~ 209 are connected in parallel
IC210 AN614
RED SEPARATE
IC211 μPC596C
RED. DET
IC212 HA17741PS
REG
IC213 AN614
BLU SEPARATE
IC214 μPC596C
BLU DET.
DL204 63.556μs(64.000μs)
1H DELAY
D205 IS2473VH
Q201 2SC1213AC
IC219 ZC0226
R-Y MATRIX
B-Y MATRIX
IC220 LA4140
AMP
IC205 ZC0235AX
IC224 ZC0246
Hi:ON
Lo:ON
IC221 ZC0236A
D203 IS2473VH
IC222 ZC0236AX
OSC
IC223 ZC0239X
TP4
TP5
TP6
TP7
TP8
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP18
TP19
TP21
TP22
TP23
+9V
P209
VIDEO signal
GND
Y signal
R-Y signal
B-Y signal
Y PROCESS
To SYNC P.C.B P304
P214
EARPHONE OUT
AUDIO GND
EXT. MIC IN
MIC OUT
J903 EARPHONE Jack
J902 EXT. MIC Jack
P213
W. IND
V. IND
B. IND
L. IND
J904 VIEWFINDER Connector
P215
AUDIO
BOOM MIC IN
J901 BOOM MIC Jack
P212
AUDIO signal
TRIG signal
12V
RETERN VIDEO
RETERN AUDIO
REC 9V
12V GND
CAMERA Connector
F201 1.6A
VIDEO P.C.Board
P203
ZOOM
12V GND
TELE signal
WIDE signal
SW904 Auto Focus swich
To Power zoom switch
P206
BLC
L. IND
RETERN VIDEO
9V (B)
9V
To SWITCH P.C.B
P211
TRIG signal
V. IND
To TRIG P.C.B
P208
SC
H. BF
P. BL
RED SHADING
BLU SHADING
C. SYNC
CP 2
To SYNC P.C.B P303
P210
To SYNC P.C.B P307

9V :Power supply which is turned ON, OFF by SW801

9V(B) :Power supply which cannot be turned ON, OFF by SW 801

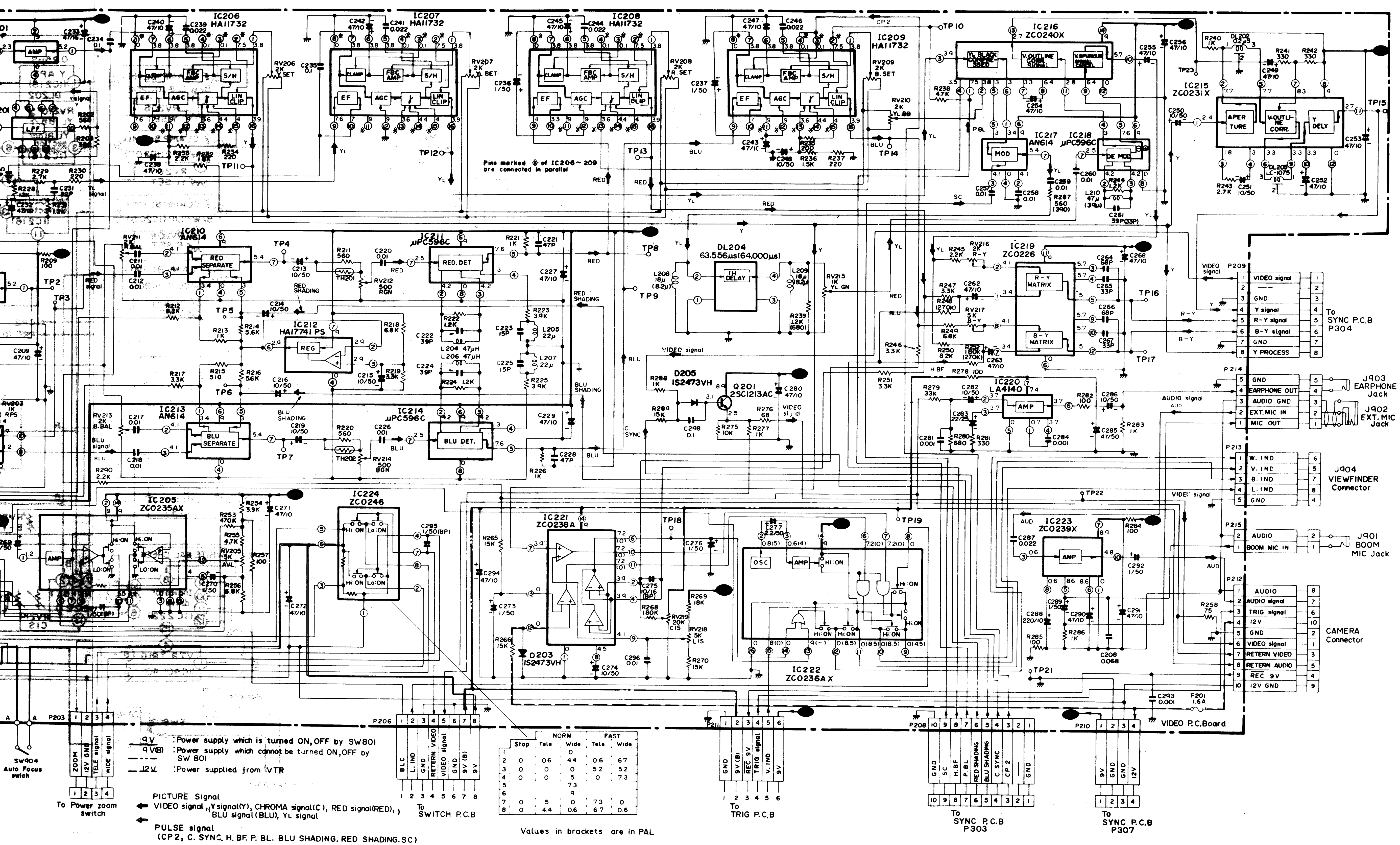
12V :Power supplied from VTR

PICTURE Signal
VIDEO signal, (Y signal(Y), CHROMA signal(C), RED signal(RED), BLU signal(BLU), YL signal)

PULSE signal
(CP2, C. SYNC. H. BF. P. BL. BLU SHADING. RED SHADING. SC)

	Stop	NORM Tele	NORM Wide	FAST Tele	FAST Wide
1			0		
2	0	0.6	4.4	0.6	6.7
3	0	0	0	5.2	5.2
4	0	0	5	0	7.3
5			7.3		
6			9		
7	0	5	0	7.3	0
8	0	4.4	0.6	6.7	0.6

Values in brackets are in PAL


IC206 HA11732
IC207 HA11732
IC208 HA11732
IC209 HA11732
CLAMP
FBC AMP
S/H
EF
AGC
LIN CLIP
RV206 2K Y. SET
RV207 2K Y. SET
RV208 2K R. SET
RV209 2K B. SET
RV210 2K YL BB
TP10
TP11
TP12
TP13
TP14
TP15
Pins marked * of IC206 ~ 209 are connected in parallel
IC216 ZC0240X
YL BLACK COMPRESSED
V. OUTLINE CORR. SIGNAL
V. SPURIOUS SIGNAL CANCEL
IC215 ZC0231X
APER TURE
V. OUTLINE CORR.
Y DELY
IC217 AN614
IC218 µPC596C
MOD
DE MOD
DL203 LC-1075
IC210 AN614
RED SEPARATE
IC211 µPC596C
RED. DET
RV212 500 RGN
IC212 HA17741PS
REG
IC213 AN614
BLU SEPARATE
IC214 µPC596C
BLU DET.
RV214 500 BGN
RED SHADING
BLU SHADING
TP4
TP5
TP6
TP7
TP8
TP9
DL204 63.556µs (64.000µs)
1H DELAY
RV215 1K YL GN
D205 1S2473VH
Q201 2SC1213AC
VIDEO signal
C SYNC
IC219 ZC0226
R-Y MATRIX
B-Y MATRIX
TP16
TP17
IC220 LA4140
AMP
IC205 ZC0235AX
RV205 5K AVL
IC224 ZC0246
Hi ON
Lo ON
IC221 ZC0238A
D203 1S2473VH
RV219 20K C1S
RV218 5K L1S
IC222 ZC0236AX
OSC
TP18
TP19
TP21
TP22
IC223 ZC0239X
F201 1.6A
P209
VIDEO signal
GND
Y signal
R-Y signal
B-Y signal
Y PROCESS
To SYNC P.C.B P304
P214
EARPHONE OUT
AUDIO GND
EXT. MIC IN
MIC OUT
J903 EARPHONE Jack
J902 EXT. MIC Jack
P213
W. IND
V. IND
B. IND
L. IND
J904 VIEWFINDER Connector
P215
AUDIO
BOOM MIC IN
J901 BOOM MIC Jack
P212
AUDIO signal
TRIG signal
12V
RETERN VIDEO
RETERN AUDIO
REC 9V
12V GND
CAMERA Connector
VIDEO P.C.Board
P203
ZOOM
12V GND
TELE signal
WIDE signal
SW904 Auto Focus switch
To Power zoom switch
P206
BLC
L. IND
RETERN VIDEO
9V (B)
9V
To SWITCH P.C.B
P211
REC 9V
V. IND
To TRIG P.C.B
P208
SC
H. BF
P. BL
BLU SHADING
RED SHADING
C. SYNC
CP 2
To SYNC P.C.B P303
P210
To SYNC P.C.B P307

9V :Power supply which is turned ON, OFF by SW801

9V(B) :Power supply which cannot be turned ON, OFF by SW 801

12V :Power supplied from VTR

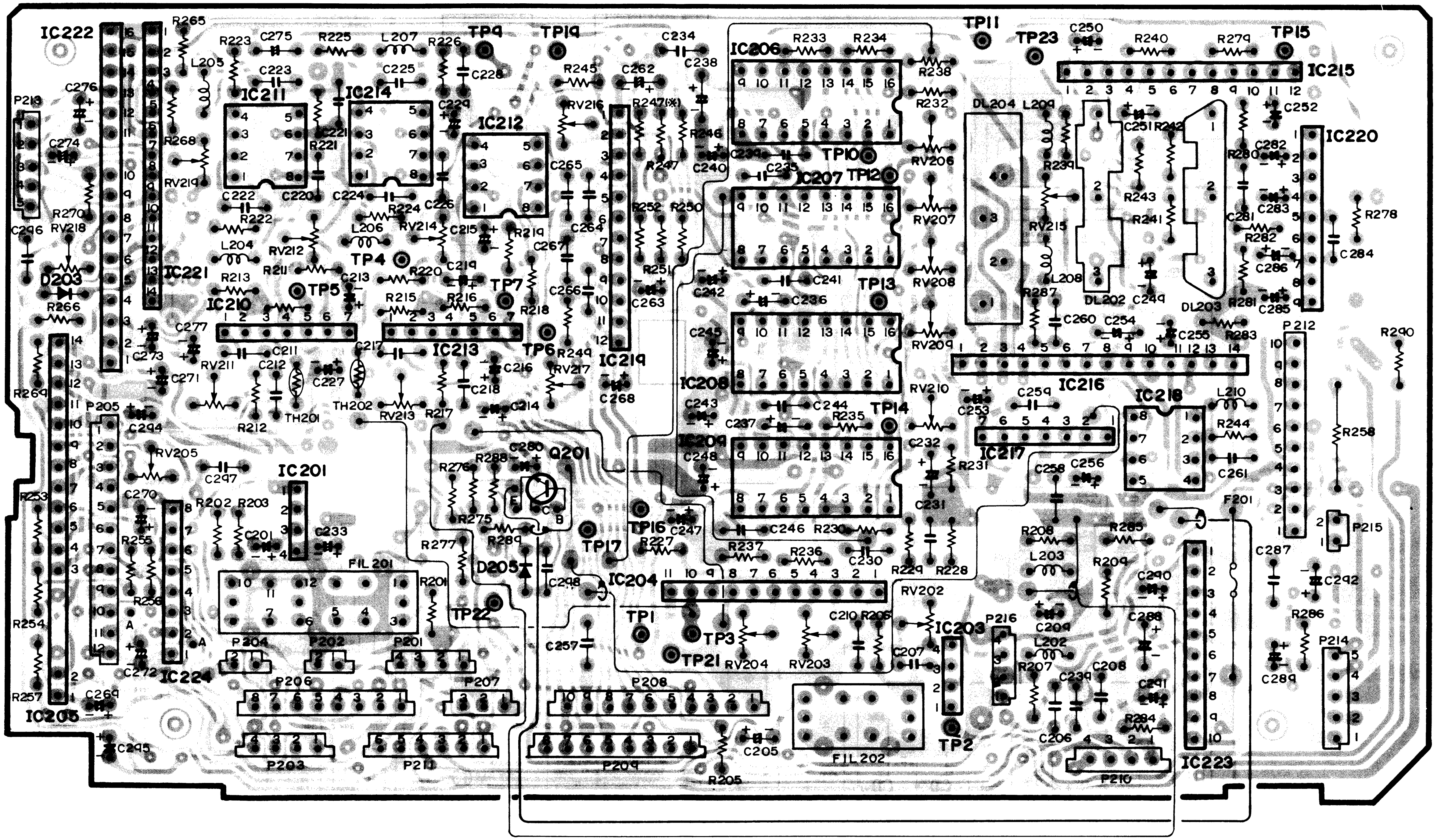
PICTURE Signal
VIDEO signal, (Y signal(Y), CHROMA signal(C), RED signal(RED), BLU signal(BLU), YL signal)

PULSE signal
(CP2, C. SYNC. H. BF. P. BL. BLU SHADING. RED SHADING. SC)

		NORM		FAST	
	Stop	Tele	Wide	Tele	Wide
1			0		
2	0	0.6	4.4	0.6	6.7
3	0	0	0	5.2	5.2
4	0	0	5	0	7.3
5			7.3		
6			9		
7	0	5	0	7.3	0
8	0	4.4	0.6	6.7	0.6

Values in brackets are in PAL

VIDEO CIRCUIT BOARD DIAGRAM


IC222
IC221
IC211
IC214
IC212
IC210
IC213
IC219
IC206
IC207
IC208
IC209
IC215
IC216
IC217
IC218
IC220
IC201
IC204
IC203
IC205
IC224
IC223
Q201
D203
D205
DL204
DL202
DL203
FIL201
FIL202
F201
TP1
TP2
TP3
TP4
TP5
TP6
TP7
TP9
TP10
TP11
TP12
TP13
TP14
TP15
TP16
TP17
TP19
TP21
TP22
TP23
P201
P202
P203
P204
P205
P206
P207
P208
P209
P210
P211
P212
P213
P214
P215
P216
TH201
TH202
RV202
RV203
RV204
RV205
RV206
RV207
RV208
RV209
RV210
RV211
RV212
RV213
RV214
RV215
RV216
RV217
RV218
RV219
L202
L203
L204
L205
L206
L207
L208
L209
L210

IC222

1	0V (4.5V)
2	0.8V (5V)
3	0.6V (4V)
4	9V
5	0V (9V)
6	7.2V (0V)
7	7.2V (0V)
8	0V
9	0V (4.5V)
10	0V (8.5V)
11	0V (8.5V)
12	0V (8.5V)
13	9V (−)
14	0V
15	8V (0V)
16	0V

( ): Flashes

IC210, IC213, IC217

1	3.4V
2	4.1V
3	4.1V
4	0V
5	3V
6	9V
7	5.4V

IC201, IC203

1	5.2V
2	9V
3	2.3V
4	0V

IC205

1	1.2V
2	9V
3	0V
4	4.2V
5	4V
6	3.2V
7	4V
8	0V
9	4V
10	5.5V
11	4.4V
12	4V
13	0V
14	9V

IC221

1	0V
2	3.9V
3	3.9V
4	3.9V
5	3.9V
6	7.2V (0V)
7	3.9V
8	4.5V
9	4.1V
10	7.2V (0V)
11	7.2V (0V)
12	0V
13	0V
14	9V

( ): Flashes

IC216

1	7.5V
2	3.8V
3	3.9V
4	3.5V
5	3V
6	3V
7	3.3V
8	6.4V
9	6.4V
10	5.7V
11	2.8V*
12	0V
13	2.7V
14	9V

IC211, IC214, IC218

1	3V	8	0V
2	4.2V	7	2.5V
3	4.2V	6	9V
4	3V	5	7.6V

IC212

1	0V	8	0V
2	2.9V	7	9V
3	2.9V	6	2.9V
4	0V	5	0V

IC224

		NORM		FAS	
	Stop	Tele	wide	Tele	wide
1	0V				
2	0V	0.6V	4.4V	0.6V	6.7V
3	0V	0V	0V	5.2V	5.2V
4	0V	0V	5V	0V	7.3V
5	7.3V				
6	9V				
7	0V	5V	0V	7.3V	0V
8	0V	4.4V	0.6V	6.7V	0.6V

Q201

B	3.1V
C	8.9V
E	2.5V

IC206, IC207, IC208, IC209

1	3.8V	16	3.9V
2	7.5V	15	4V
3	0.1V	14	4.4V
4	0.1V	13	3.6V
5	3.8V	12	9V
6	3.8V	11	9V
7	3.8V	10	0V (IC207 : 3.3V) (IC208, 209 : 7V)
8	0V	9	0V (IC207 : 4V) (IC208, 209 : 7.6V)

IC220

1	0.7V
2	3.7V
3	3.7V
4	3.7V
5	0V
6	3.7V
7	7.4V
8	7.2V
9	3.7V

IC215

1	2.4V
2	7.7V
3	1.8V
4	3V
5	7.7V
6	3.3V
7	8.3V
8	9V
9	3.3V
10	3.3V
11	2.7V
12	0V

IC219

1	3.4V
2	4.1V
3	5.7V
4	5.7V
5	5V
6	0V
7	3.4V
8	4.1V
9	5.7V
10	5.7V
11	9V
12	5V

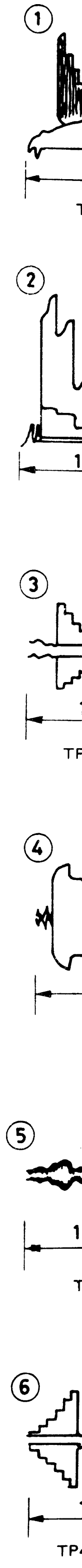
IC204

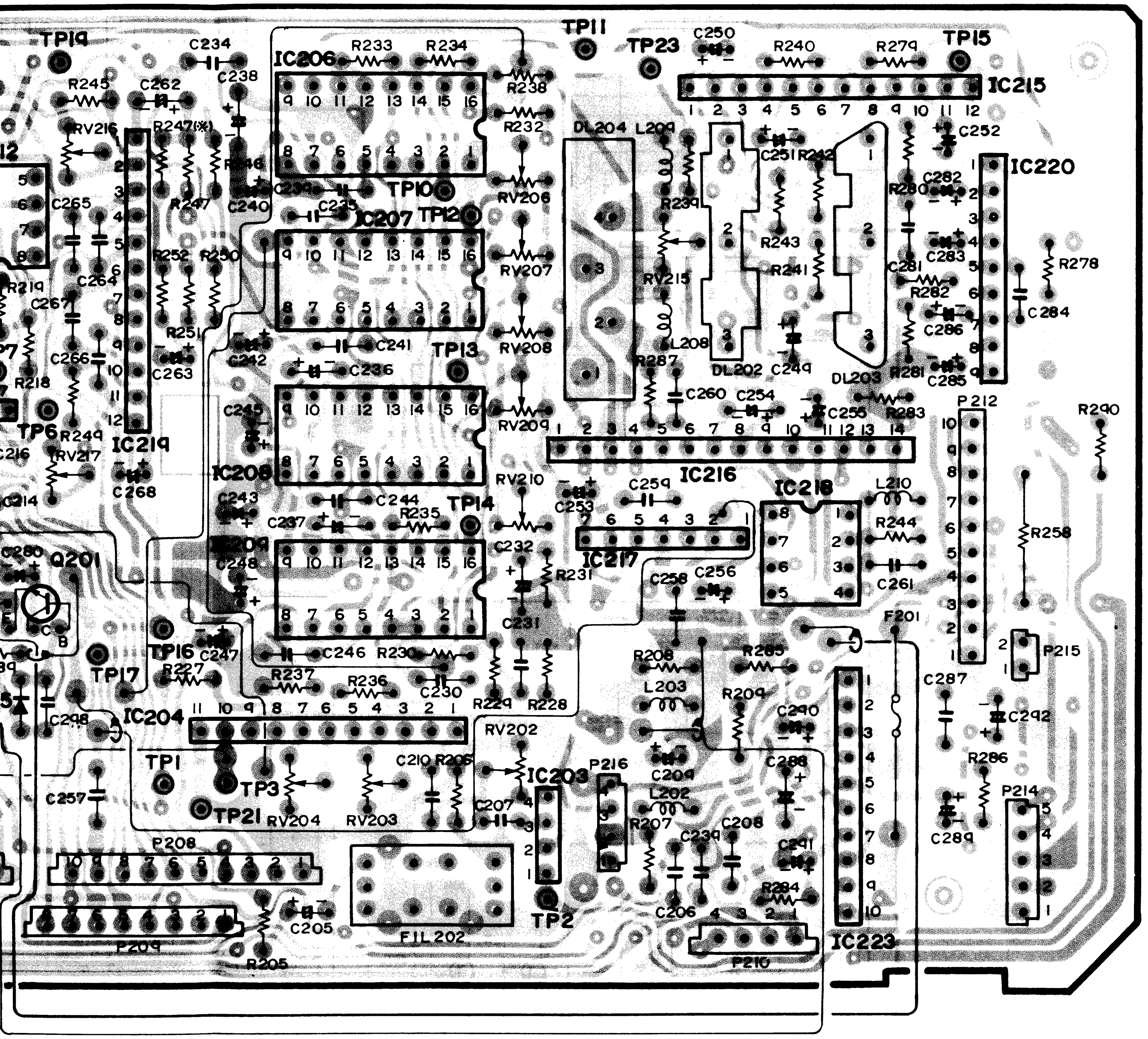
1	1.4V
2	7.7V
3	7.7V
4	0.7V
5	0.7V
6	0.7V
7	0.7V
8	1.2V
9	8.4V
10	7V
11	0V

IC223

1	0V
2	0V
3	0.6V
4	1.7V
5	8.6V
6	8.6V
7	8.9V
8	0.6V
9	4.8V
10	4.8V

WAVE




TP19
C234
R233
R234
IC206
R238
TP11
TP23
C250
R240
R279
TP15
IC215
R245
C262
C238
R232
DL204
L209
C252
IC220
RV216
R247(※)
R246
TP10
C239
C235
IC207
TP12
RV206
C251
R242
R280
C282
C265
R247
C240
R234
R243
C283
R278
C264
R252
R250
RV207
RV215
R241
C281
R282
C284
R219
C267
C241
TP13
R251
R208
RV208
L208
C286
C266
C242
C236
R287
DL202
C249
DL203
R261
C285
R218
C263
C260
C254
C255
R283
P212
R290
TP6
R249
C245
RV209
RV217
IC219
IC216
C268
IC208
RV210
C259
IC218
L210
C214
C243
C253
C244
TP14
R244
R258
C237
R235
C280
Q201
IC209
C248
C232
IC217
R231
C258
C256
C261
C231
F201
TP16
C247
C246
R230
R206
R265
P215
TP17
R227
R237
R236
C230
R229
R228
L203
R209
C287
C290
C292
C298
IC204
RV202
C288
R286
TP1
C210
R205
P216
C209
TP3
IC203
L202
P214
C257
TP21
RV204
RV203
C207
R207
C208
C239
C289
P208
C291
R284
C206
C205
FIL202
TP2
P209
R205
P210
IC223

IC218	
8	0V
7	2.5V
6	9V
5	7.6V

IC212

1	0V	8	0V
2	2.9V	7	9V
3	2.9V	6	2.9V
4	0V	5	0V

Q201

B	3.1V
C	8.9V
E	2.5V

IC220

1	0.7V
2	3.7V
3	3.7V
4	3.7V
5	0V
6	3.7V
7	7.4V
8	7.2V
9	3.7V

IC215

1	2.4V
2	7.7V
3	1.8V
4	3V
5	7.7V
6	3.3V
7	8.3V
8	9V
9	3.3V
10	3.3V
11	2.7V
12	0V

IC219

1	3.4V
2	4.1V
3	5.7V
4	5.7V
5	5V
6	0V
7	3.4V
8	4.1V
9	5.7V
10	5.7V
11	9V
12	5V

IC204

1	1.4V
2	7.7V
3	7.7V
4	0.7V
5	0.7V
6	0.7V
7	0.7V
8	1.2V
9	8.4V
10	7V
11	0V

IC223

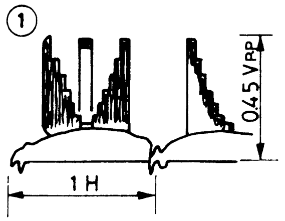
1	0V
2	0V
3	0.6V
4	1.7V
5	8.6V
6	8.6V
7	8.9V
8	0.6V
9	4.8V
10	4.8V

NORM		FAS	
Tele	wide	Tele	wide
0V			
0.6V	4.4V	0.6V	6.7V
0V	0V	5.2V	5.2V
0V	5V	0V	7.3V
7.3V			
9V			
5V	0V	7.3V	0V
4.4V	0.6V	6.7V	0.6V

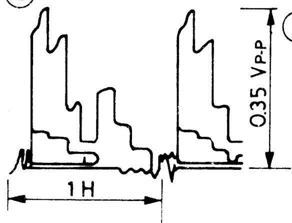
IC206, IC207, IC208, IC209

1	3.8V	16	3.9V
2	7.5V	15	4V
3	0.1V	14	4.4V
4	0.1V	13	3.6V
5	3.8V	12	9V
6	3.8V	11	9V
7	3.8V	10	0V (IC207 : 3.3V) (IC208, 209 : 7V)
8	0V	9	0V (IC207 : 4V) (IC208, 209 : 7.6V)

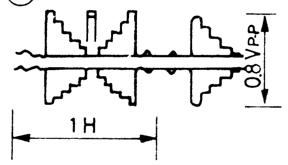
WAVEFORM

①


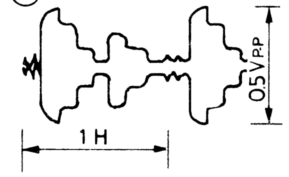
TP1 (Gray scale)

②


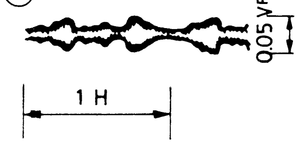
TP1 (Color-bar)

③


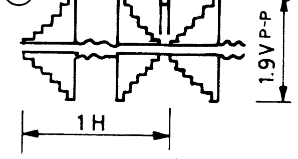
TP2 (Gray scale)

④


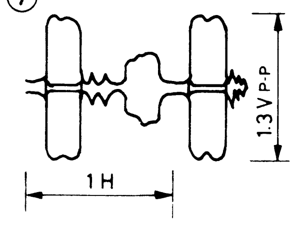
TP2 (Color-bar)

⑤


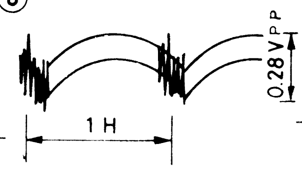
TP3 (Gray scale)

⑥


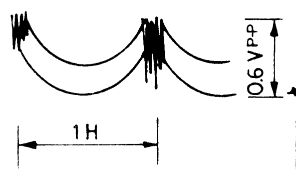
TP4 (Gray scale) -ル)

⑦


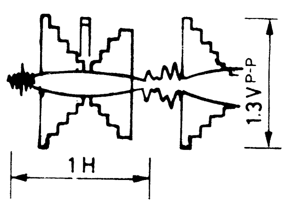
TP4 (Color-bar)

⑧


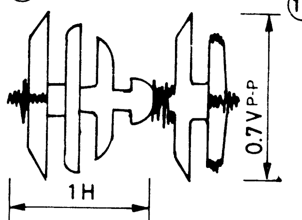
TP5(RED SHADING)

⑨


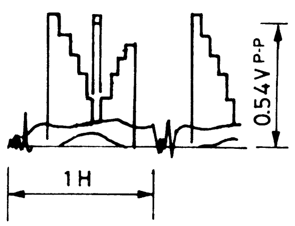
TP6(BLU SHADEING)

⑩


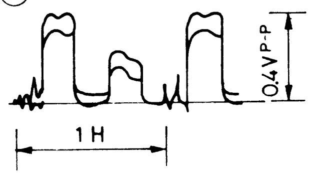
TP7 (Gray scale)

⑪


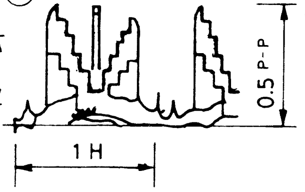
TP7 (Color-bar)

⑫


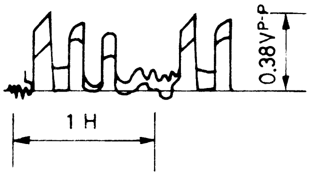
TP8 (Gray scale)

⑬


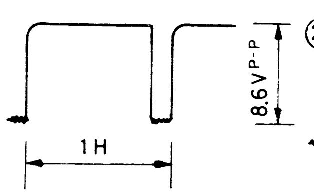
TP8 (Color-bar)

⑭


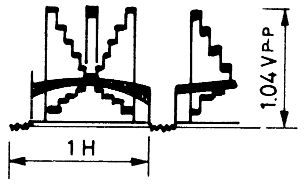
TP9 (Gray scale)

⑮


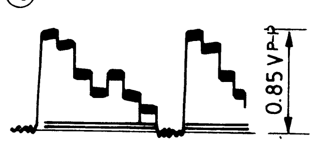
TP9 (Color-bar)

⑯


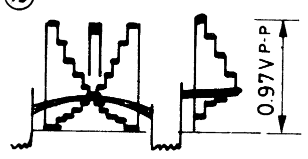
TP10(P. BL)

⑰


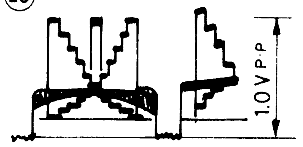
TP11 (Gray scale)

⑱


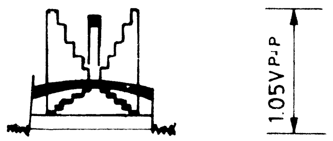
TP11 (Color-bar)

⑲


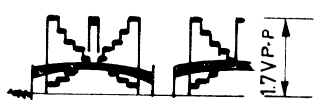
TP12 (Gray scale)

⑳


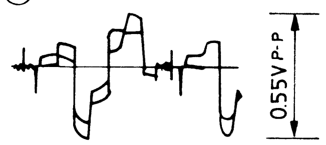
TP13 (Gray scale)

㉑


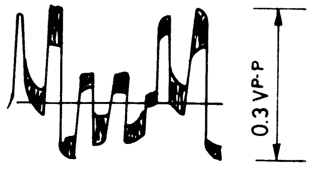
TP14 (Gray scale)

㉒


TP15 (Gray scale)

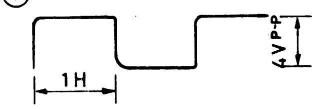
㉓


TP16 (Color-bar)

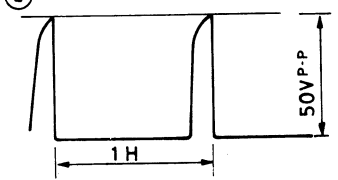
㉔


TP17 (Color-bar)

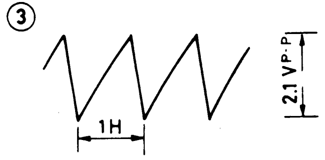
WAVEFORM

①


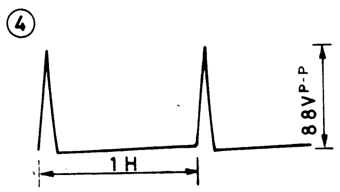
Q 301 COLLECTOR (C. HD)

②


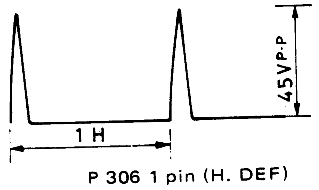
Q 302 COLLECTOR

③


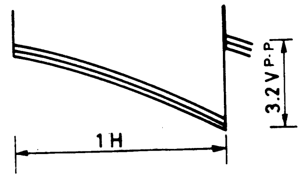
P 306 2 pin (H. DEF)

④


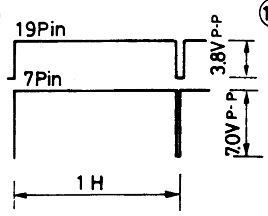
Q 309 COLLECTOR

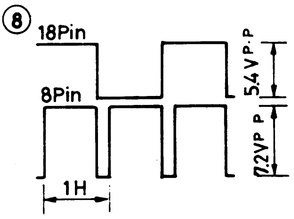
⑤


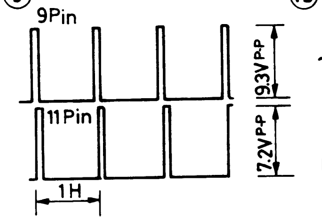
P 306 1 pin (H. DEF)

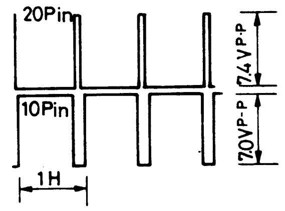
⑥


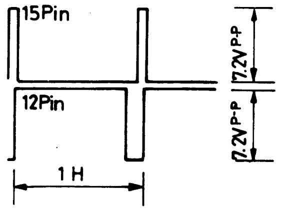
P 306 7 pin (V. DEF)

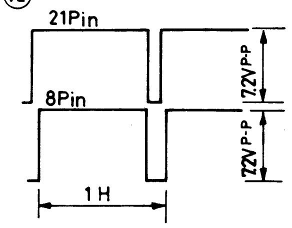
⑦

19Pin
7Pin
3.8VP-P
70VP-P
1H
IC 305 (19 pin : F. V)
(7 pin : VD)

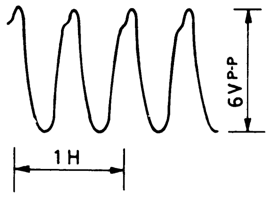
⑧

18Pin
8Pin
5.4VP-P
7.2VP-P
1H
IC 305 (18 pin : CP-2)
(8 pin : C, HD) D)

⑨

9Pin
11Pin
9.3VP-P
7.2VP-P
1H
IC 305 (9 pin : CP-1)
(11 pin : BURST. FP)

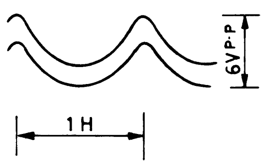
⑩

20Pin
10Pin
7.4VP-P
70VP-P
1H
IC 305 (20 pin : LINE SW)
(10 pin : COMP·BLK·P)

⑪

15Pin
12Pin
7.2VP-P
7.2VP-P
1H
IC 305 (15 pin : H·BF)
(12 pin : B·BLK)

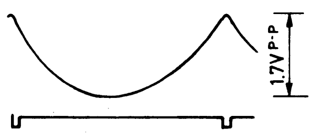
⑫

21Pin
8Pin
7.2VP-P
7.2VP-P
1H
IC 305 (21 pin : C·SYNC)
(8 pin : C·HD)

⑬


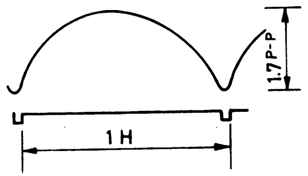
IC 305 26 pin (SC)

⑭


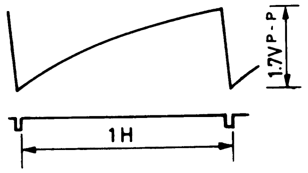
TP4

⑮


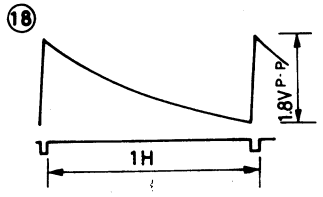
IC 309 8 pin (V. PARA)

⑯


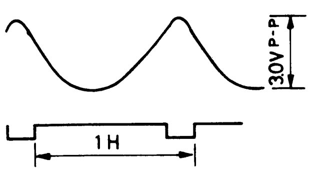
IC 309 7 pin (V. PARA)

⑰


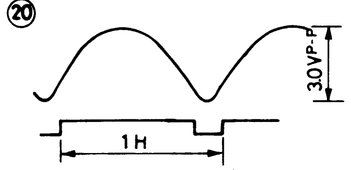
IC 309 4 pin (V. SAW)

⑱


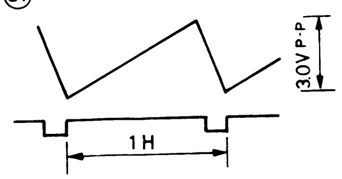
IC 309 3 pin (V. SAW)

⑲


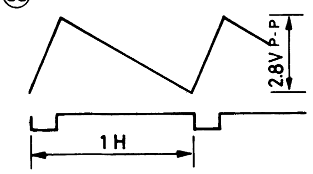
IC 312 8 pin (H. PARA)

⑳


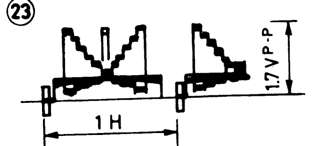
IC 312 7 pin (H. PARA)

㉑


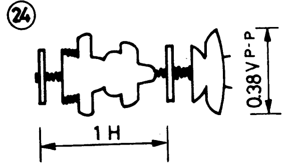
IC 312 4 pin (H. SAW)

㉒


IC 312 3 pin (H. SAW)

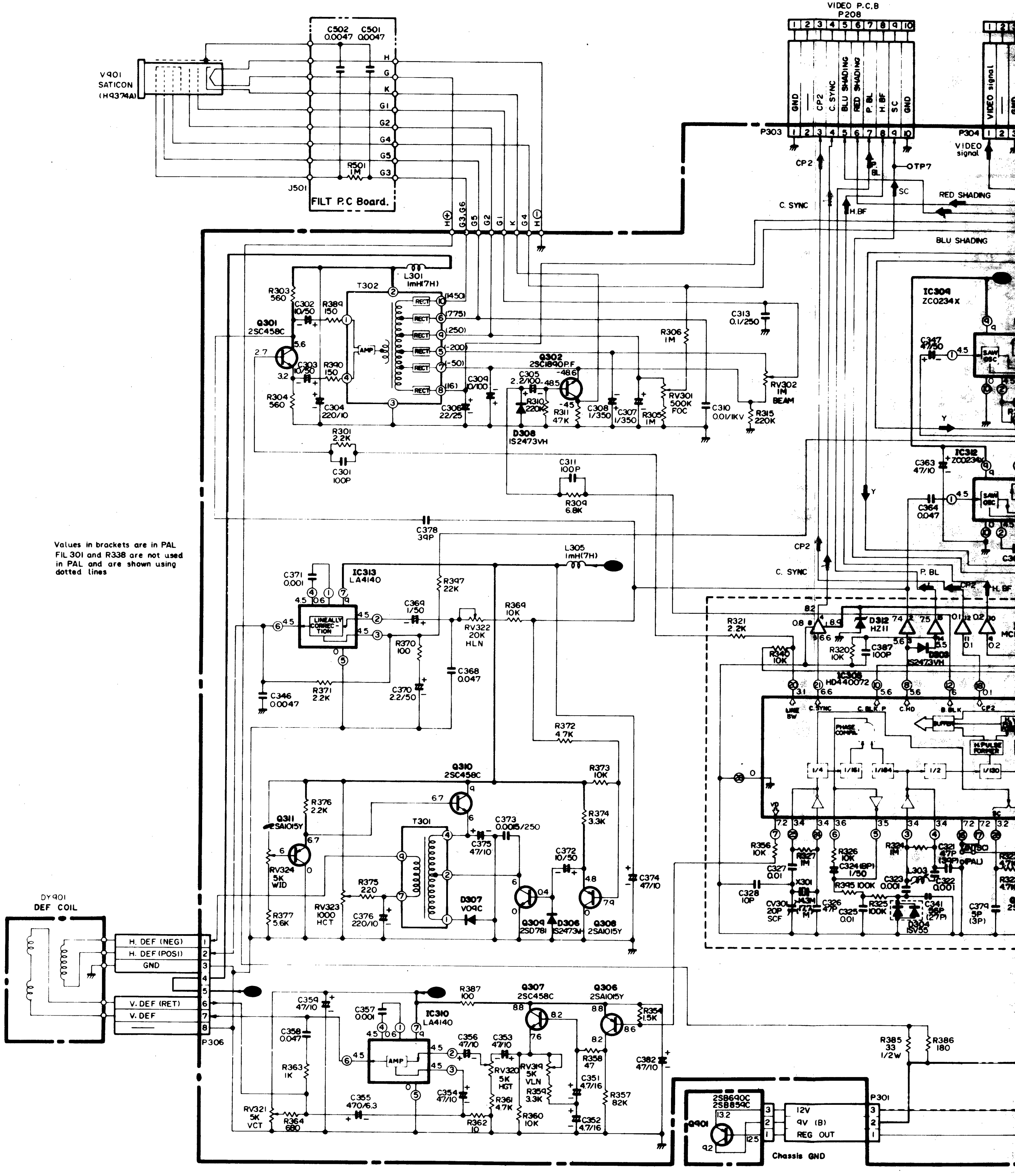
㉓


IC 306 8 pin (Gray scale)

㉔


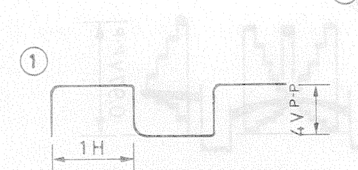
IC 306 5 pin (Color-bar)

SYNC CIRCUIT DIAGRAM

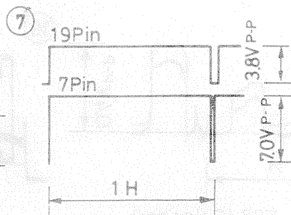

To VIDEO P.C.B P208
V901 SATICON (H9374A)
C502 0.0047
C501 0.0047
R501 1M
J501
FILT P.C Board.
P303
P304
GND
CP2
C. SYNC
BLU SHADING
RED SHADING
P. BL
H. BF
SC
VIDEO signal
TP7
RED SHADING
BLU SHADING
C SYNC
Q301 2SC458C
Q302 2SC1890PF
T302
L301 1mH(7H)
R303 560
R304 560
R389 150
R390 150
C302 10/50
C303 10/50
C304 220/10
R301 2.2K
C301 100P
C305 2.2/100
C306 22/25
C309 0.1/100
C307 1/350
C308 1/350
R310 220K
R311 47K
D308 1S2473VH
R305 1M
R306 1M
RV301 500K FOC
RV302 1M BEAM
R315 220K
C310 0.01/1KV
C313 0.1/250
C311 100P
R309 6.8K
C378 39P
IC304 ZC0234X
IC312 ZC0234X
C347 47/10
C363 47/10
C364 0.047
IC313 LA4140
LINEALITY CORRECTION
C371 0.001
C346 0.0047
R397 22K
C369 1/50
R370 100
R371 2.2K
C370 2.2/50
RV322 20K HLN
C368 0.047
R369 10K
L305 1mH(7H)
R372 4.7K
R373 10K
R374 3.3K
Q310 2SC458C
Q311 2SA1015Y
R376 2.2K
RV324 5K WID
R377 5.6K
T301
C375 47/10
C373 0.0015/250
C372 10/50
R375 220
RV323 1000 HCT
C376 220/10
D307 V09C
Q304 2SD781
D306 1S2473VH
Q308 2SA1015Y
C374 47/10
R321 2.2K
R340 10K
D312 HZ11
D309 1S2473VH
R320 10K
C387 100P
IC305 HD440072
PHASE COMP.
H-PULSE FORMER
1/4
1/161
1/184
1/2
1/130
R356 10K
C327 0.01
R327 1M
X301
C328 10P
CV301 20P SCF
C326 47P
R395 100K
C325 0.01
R326 10K
C324 (BP) 1/50
C323 0.001
C322 0.001
C341 56P (27P)
D304 1SV55
C379 5P (3P)
DY901 DEF COIL
H. DEF (NEG)
H. DEF (POSI)
GND
V. DEF (RET)
V. DEF
P306
C359 47/10
C357 0.001
C358 0.047
IC310 LA4140
AMP
R363 1K
RV321 5K VCT
R364 680
C355 470/6.3
R387 100
C356 47/10
C353 47/10
C354 47/10
RV320 5K HGT
RV319 5K VLN
R359 3.3K
R361 4.7K
R362 10
R360 10K
Q307 2SC458C
Q306 2SA1015Y
R354 1.5K
R358 47
C351 47/16
C352 47/16
R357 82K
C382 47/10
R385 33 1/2W
R386 180
Q901 2SB690C 2SB854C
12V
9V (B)
REG OUT
Chassis GND
P301

Values in brackets are in PAL
FIL 301 and R338 are not used
in PAL and are shown using
dotted lines

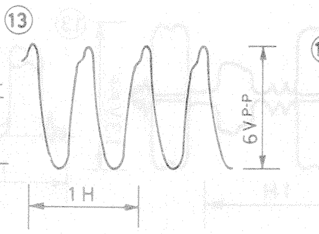
WAVEFORM



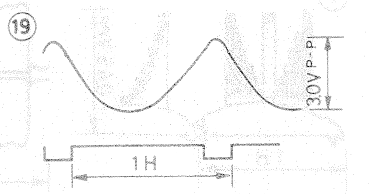
Q 301 COLLECTOR (C. HD)



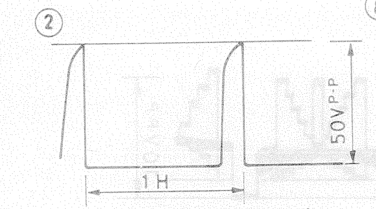
IC 305 (19 pin : F. V)
(7 pin : VD)



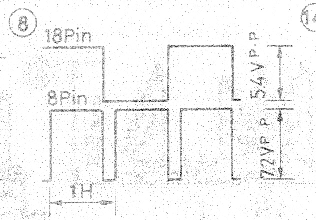
IC 305 26 pin (SC)



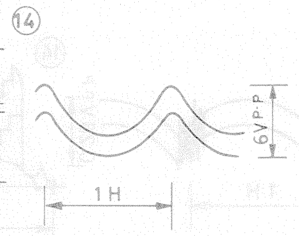
IC 312 8 pin (H. PARA)



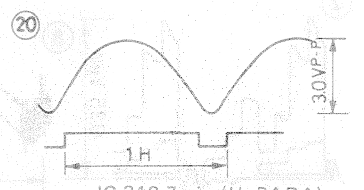
Q 302 COLLECTOR



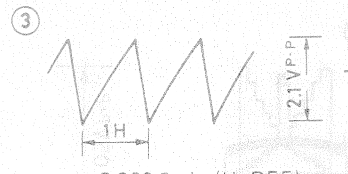
IC 305 (18 pin : CP-2)
(8 pin : C. HD) D)



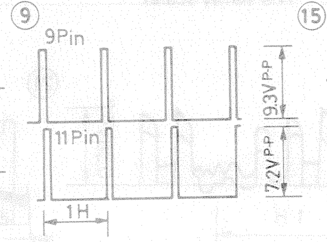
TP4



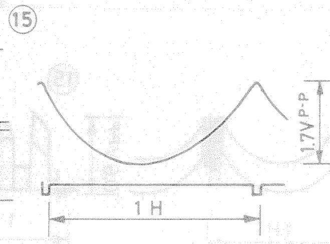
IC 312 7 pin (H. PARA)



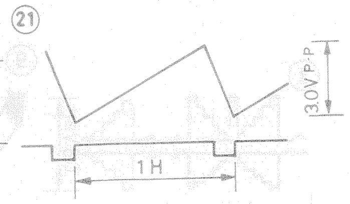
P 306 2 pin (H. DEF)



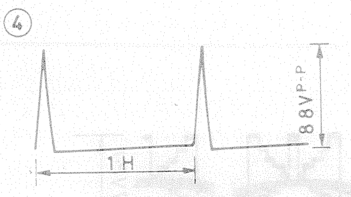
IC 305 (9 pin : CP-1)
(11 pin : BURST. FP)



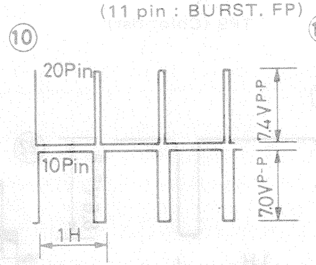
IC 309 8 pin (V. PARA)



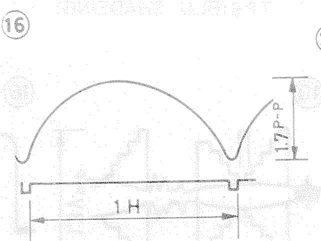
IC 312 4 pin (H. SAW)



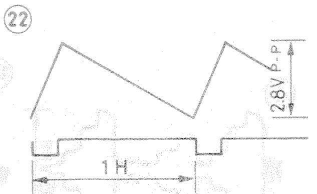
Q 309 COLLECTOR



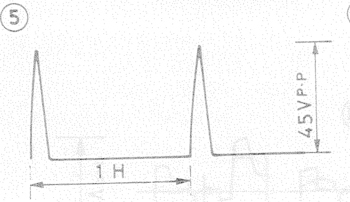
IC 305 (20 pin : LINE SW)
(10 pin : COMP-BLK-P)



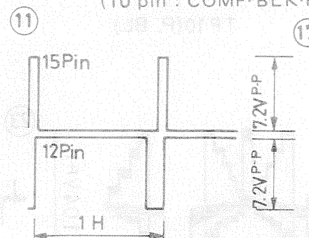
IC 309 7 pin (V. PARA)



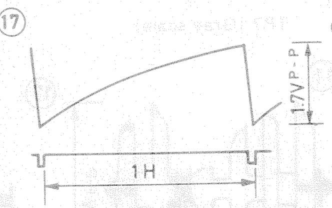
IC 312 3 pin (H. SAW)



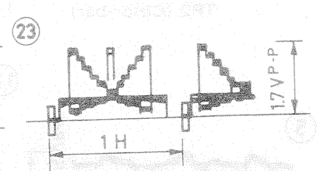
P 306 1 pin (H. DEF)



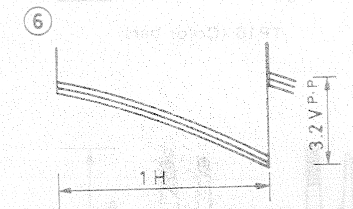
IC 305 (15 pin : H-BF)
(12 pin : B-BLK)



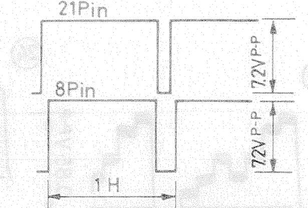
IC 309 4 pin (V. SAW)



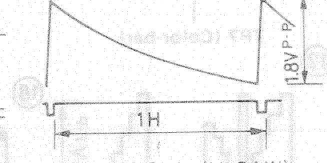
IC 306 8 pin (Gray scale)



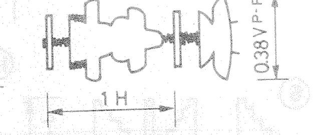
P 306 7 pin (V. DEF)



IC 305 (21 pin : C-SYNC)
(8 pin : C-HD)

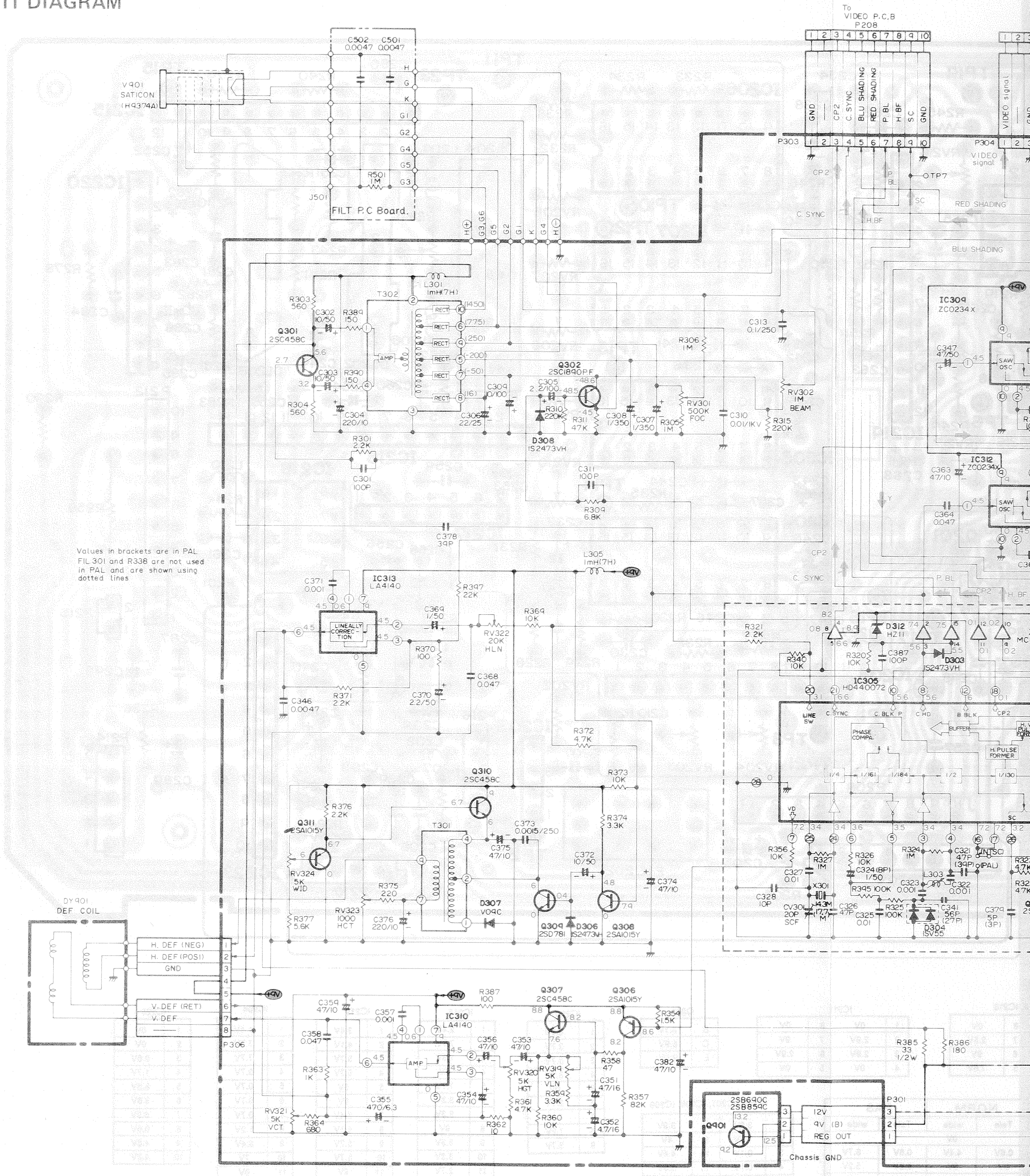


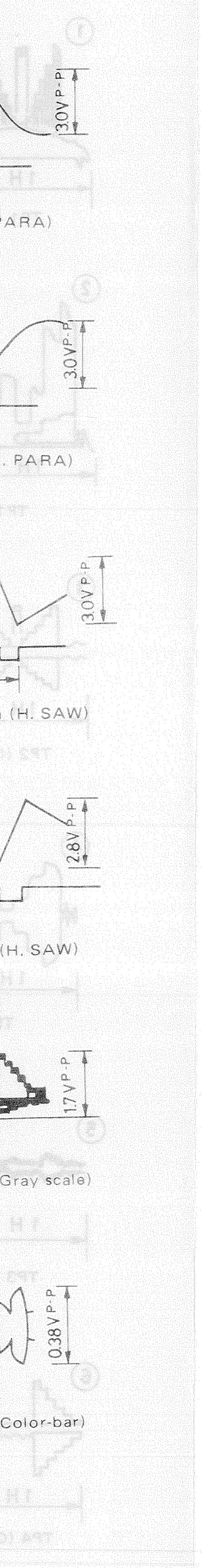
IC 309 3 pin (V. SAW)



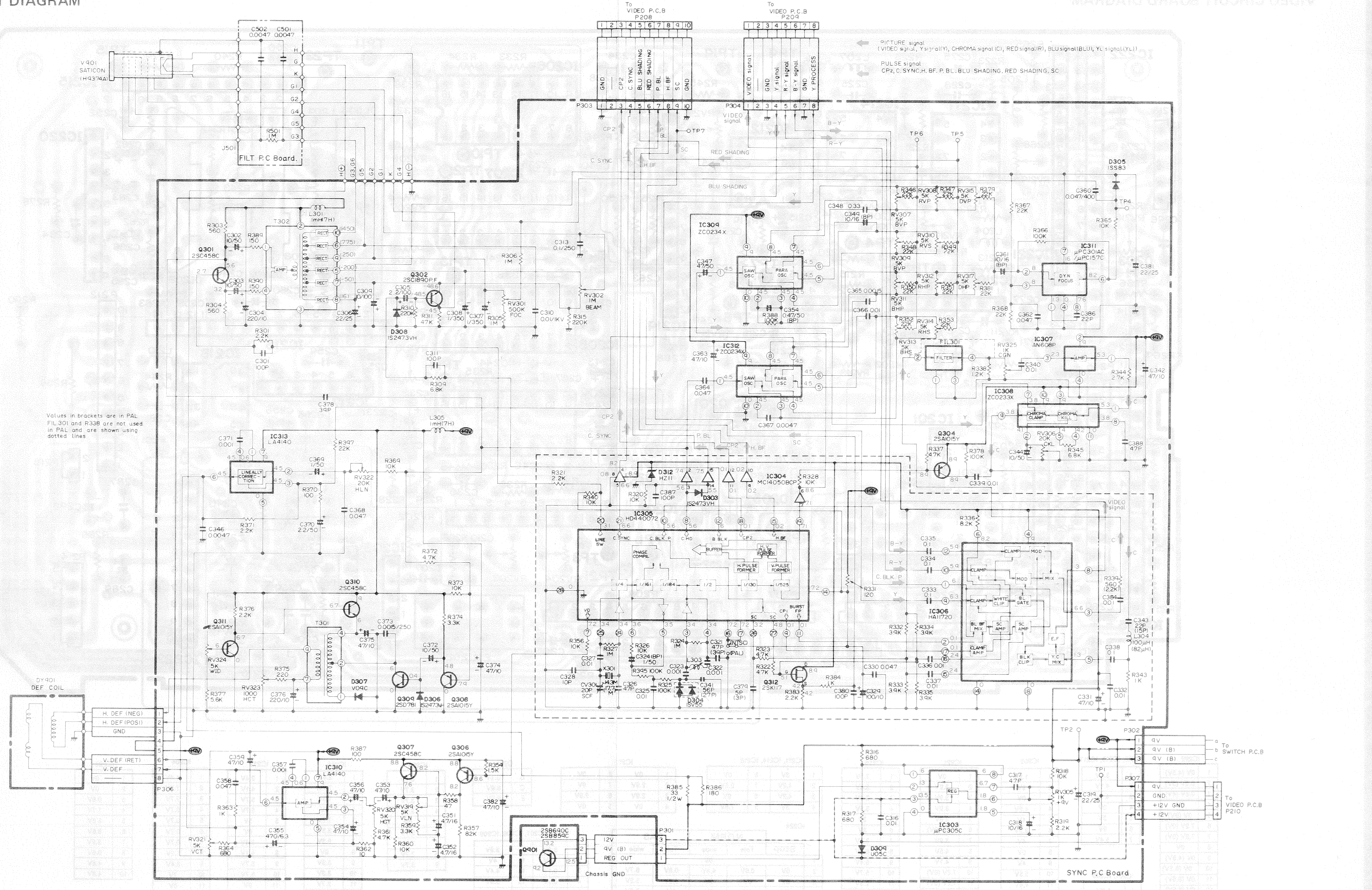
IC 306 5 pin (Color-bar)

SYNC CIRCUIT DIAGRAM


To VIDEO P.C.B P208
GND
CP2
C.SYNC
BLU SHADING
RED SHADING
P.BL
H.BF
SC
GND
VIDEO signal
P303
P304
TP7
V401 SATICON (H9374A)
C502 0.0047
C501 0.0047
H
G
K
G1
G2
G4
G5
G3
R501 1M
J501
FILT P.C Board
C SYNC
RED SHADING
BLU SHADING
IC309 ZC0234X
L301 1mH(7H)
T302
R303 560
Q301 2SC458C
C302 10/50
R389 150
C303 10/50
R390 150
R304 560
C304 220/10
RECT
AMP
Q302 2SC1890PF
C305 2.2/100
C309 0.1/100
C306 22/25
R310 220K
R311 47K
C308 1/350
C307 1/350
R305 1M
RV301 500K FOC
C310 0.01/1KV
RV302 1M BEAM
R315 220K
C313 0.1/250
R306 1M
C347 47/50
D308 1S2473VH
R301 2.2K
C301 100P
C311 100P
R309 6.8K
C363 47/10
IC312 ZC0234X
C364 0.047
SAW OSC
C378 3.3P
L305 1mH(7H)
C371 0.001
IC313 LA4140
LINEALITY CORRECTION
R397 22K
C369 1/50
R370 100
RV322 20K HLN
R364 10K
C346 0.0047
R371 2.2K
C368 0.047
C370 2.2/50
R372 4.7K
R373 10K
Q310 2SC458C
R374 3.3K
R376 2.2K
Q311 2SA1015Y
T301
C373 0.0015/250
C375 47/10
C372 10/50
C374 47/10
RV324 5K WID
R375 220
RV323 1000 HCT
R377 5.6K
C376 220/10
D307 V04C
Q309 2SD781
D306 1S2473VH
Q308 2SA1015Y
R321 2.2K
D312 HZ11
R340 10K
R320 10K
C387 100P
D303 1S2473VH
IC305 HD440072
LINE SW
C SYNC
C.BLK.P
C.HD
B.BLK
CP2
PHASE COMP
BUFFER
H.PULSE FORMER
R356 10K
R327 1M
R326 10K
C324 (BP) 1/50
R324 1M
C321 47P (33P)
NTSC (PAL)
R395 100K
L303
C322 0.001
C323 0.001
C327 0.01
X301
C328 10P
CV301 20P SCF
C326 47P
C325 0.01
R325 100K
C341 56P (27P)
D304 1SV55
C379 5P (3P)
DY901 DEF. COIL
H. DEF (NEG)
H. DEF (POSI)
GND
V-DEF (RET)
V-DEF
P306
C359 47/10
C357 0.001
C358 0.047
IC310 LA4140
R387 100
Q307 2SC458C
Q306 2SA1015Y
R354 1.5K
C356 47/10
C353 47/10
RV320 5K HGT
RV319 5K VLN
R359 3.3K
R358 47
C351 47/16
C382 47/10
R357 82K
R363 1K
C355 470/6.3
C354 47/10
R361 4.7K
R362 10
R360 10K
C352 47/16
RV321 5K VCT
R364 680
R385 33 1/2W
R386 180
Q901 2SB690C 2SB859C
12V
9V (B)
REG OUT
Chassis GND
P301
Values in brackets are in PAL
FIL 301 and R338 are not used in PAL and are shown using dotted lines

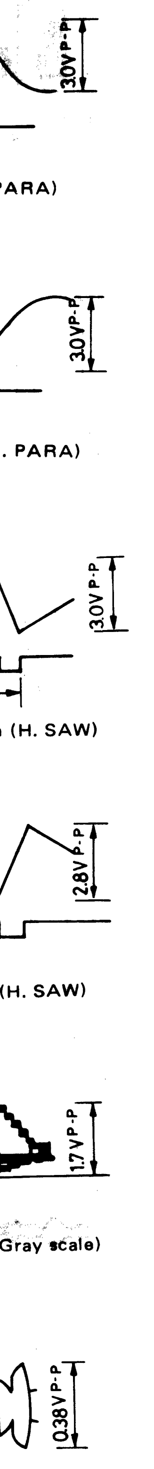


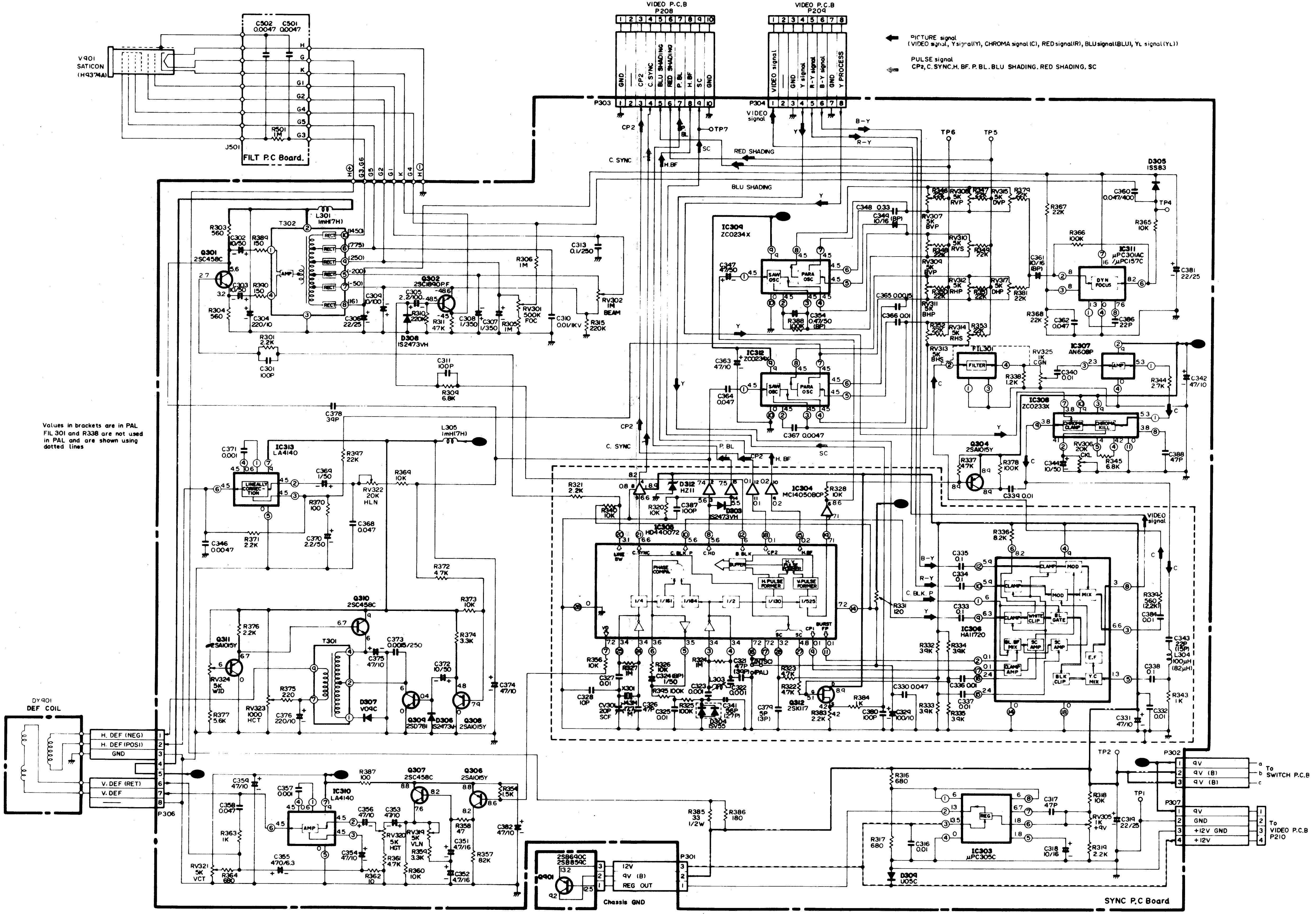
SYNC CIRCUIT DIAGRAM


To VIDEO P.C.B P208
To VIDEO P.C.B P209
GND
CP2
C.SYNC
BLU SHADING
RED SHADING
P.BL
H.BF
SC
GND
VIDEO signal
GND
Y signal
R-Y signal
B-Y signal
GND
Y PROCESS
P303
P304
PICTURE signal (VIDEO signal, Y signal(Y), CHROMA signal (C), RED signal(R), BLU signal(BLU), YL signal (YL))
PULSE signal CP2, C.SYNC, H.BF, P.BL, BLU SHADING, RED SHADING, SC
V401 SATICON (H9374A)
C502 0.0047
C501 0.0047
R501 1M
J501
FILT. P.C Board
L301 1mH(7H)
T302
Q301 2SC458C
Q302 2SC1890PF
D308 1S2473VH
RV301 500K FOC
RV302 1M BEAM
R315 220K
C310 0.01/1KV
C313 0.1/250
IC309 ZC0234X
IC312 ZC0234X
IC311 μPC301AC (μPC157C)
IC307 AN608P
IC308 ZC0233X
FIL301
Q304 2SA1015Y
D305 1SS83
TP4
TP5
TP6
TP7
IC313 LA4140
L305 1mH(7H)
RV322 20K HLN
Q310 2SC458C
Q311 2SA1015Y
RV324 5K WID
T301
D307 V09C
Q309 2SD781
D306 1S2473
Q308 2SA1015Y
RV323 1000 HCT
IC304 MC14050BCP
IC305 HD440072
D312 HZ11
D303 1S2473VH
D304 1SV55
IC306 HA11720
Q312 2SK117
L304 100μH (82μH)
DY401 DEF COIL
H. DEF (NEG)
H. DEF (POSI)
GND
V-DEF (RET)
V-DEF
P306
IC310 LA4140
Q307 2SC458C
Q306 2SA1015Y
RV320 5K HGT
RV319 5K VLN
RV321 5K VCT
Q901 2SB640C 2SB859C
12V
9V (B)
REG OUT
Chassis GND
P301
IC303 μPC305C
D309 U05C
RV305 1K +9V
TP1
TP2
P302
9V
9V (B)
To SWITCH P.C.B
P307
9V
GND
+12V GND
+12V
To VIDEO P.C.B P210
SYNC P.C Board

Values in brackets are in PAL
FIL301 and R338 are not used in PAL and are shown using dotted lines

SYNC CIRCUIT DIAGRAM

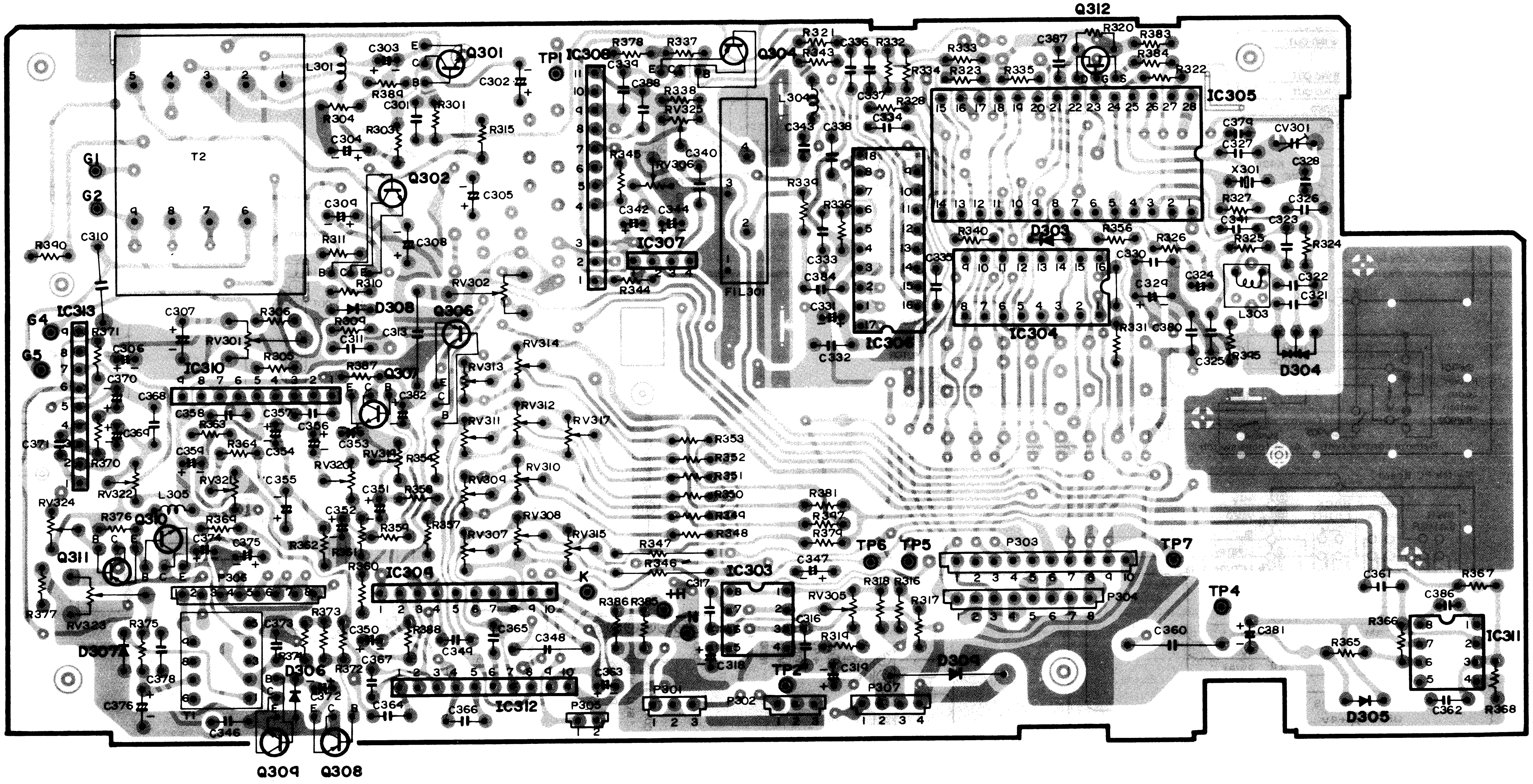




V901
SATICON
(H9374A)
C502 0.0047
C501 0.0047
R501 1M
J501
FILT P.C Board.
To VIDEO P.C.B P208
To VIDEO P.C.B P209
GND
CP2
C.SYNC
BLU SHADING
RED SHADING
P.BL
H.BF
SC
VIDEO signal
Y signal
R-Y signal
B-Y signal
Y PROCESS
P303
P304
PICTURE signal
(VIDEO signal, Y signal(Y), CHROMA signal (C), RED signal(R), BLU signal(BLU), YL signal (YL))
PULSE signal
CP2, C.SYNC, H. BF. P. BL. BLU SHADING. RED SHADING, SC
Q301 2SC458C
T302
L301 1mH(7H)
Q302 2SC1940PF
D308 1S2473VH
RV301 500K FOC
RV302 1M BEAM
C313 0.1/250
IC309 ZC0234X
IC312 ZC0234X
IC311 µPC301AC /µPC157C
IC307 AN608P
FIL301
IC308 ZC0233X
Q304 2SA1015Y
IC313 LA4140
L305 1mH(7H)
IC305 HD440072
IC304 MC14050BCP
D312 HZ11
D303 1S2473VH
IC306 HA11720
Q310 2SC458C
Q311 2SA1015Y
T301
Q309 2SD781
D306 1S2473VH
Q308 2SA1015Y
D307 V09C
DY901 DEF COIL
H. DEF (NEG)
H. DEF (POSI)
GND
V. DEF (RET)
V. DEF
P306
IC310 LA4140
Q307 2SC458C
Q306 2SA1015Y
Q401 2SB640C 2SB859C
12V
9V (B)
REG OUT
P301
Chassis GND
IC303 µPC305C
D309 U05C
P302
9V
9V (B)
To SWITCH P.C.B
P307
GND
+12V GND
+12V
To VIDEO P.C.B P210
SYNC P.C Board
TP1
TP2
TP4
TP5
TP6
TP7

Values in brackets are in PAL
FIL 301 and R338 are not used in PAL and are shown using dotted lines

SYNC CIRCUIT BOARD DIAGRAM


Q312
Q301
Q304
Q302
Q306
Q307
Q310
Q311
Q309
Q308
TP1
TP2
TP4
TP5
TP6
TP7
T2
G1
G2
G4
G5
K
IC303
IC304
IC305
IC306
IC307
IC308
IC309
IC310
IC311
IC312
IC313
FIL301
L301
L303
L304
L305
X301
CV301
D303
D304
D305
D306
D307A
D308
D309
P301
P302
P303
P304
P305
P306
P307
RV301
RV302
RV305
RV306
RV307
RV308
RV309
RV310
RV311
RV312
RV313
RV314
RV315
RV317
RV319
RV320
RV321
RV322
RV323
RV324
RV325

IC305

1	6.2V	28	0V
2	0.1V	27	4.8V
3	3.4V	26	3.2V
4	3.4V	25	3.4V
5	3.5V	24	3.4V
6	3.6V	23	0V
7	7.2V	22	7.2V
8	5.6V	21	6.6V
9	0.1V	20	3.1V
10	5.6V	19	7.1V
11	0.1V	18	0.1V
12	6V	17	7.2V
13	0V	16	7.2V
14	7.2V	15	0.2V

IC308

1	5.3V
2	4.1V
3	9V
4	4.2V
5	4V
6	4.3V
7	3.8V
8	3.8V
9	3.8V
10	9V
11	0V

IC309, IC312

1	4.5V
2	4.5V
3	4.5V
4	4.5V
5	4.5V
6	4.5V
7	4.5V
8	4.5V
9	9V
10	0V

IC306

17	0.1V		
1	6V	16	2.4V
2	0.1V	15	2.4V
3	6.6V	14	0V
4	9V	13	6.5V
5	1.3V	12	5.9V
6	8.2V	11	6.5V
7	6.2V	10	5.9V
8	3V	9	6.3V
18	0V		

IC310, IC313

1	0.6V
2	4.5V
3	4.5V
4	4.5V
5	0V
6	4.5V
7	9V
8	8.8V
9	4.5V

IC304

1	8.9V	16	0V
2	7.4V	15	7.5V
3	5.6V	14	5.5V
4	8.2V	13	9.6~10.1V
5	6.6V	12	0.1V
6	8.6V	11	0.1V
7	7.1V	10	0.2V
8	0.8V	9	0.2V

IC311

1	1.3V	8	7.6V
2	8V	7	16V
3	8V	6	8.2V
4	0V	5	1.2V

IC303

1	6V	8	6V
2	13V	7	6.7V
3	13.5V	6	1.8V
4	0V	5	1.8V

IC307

1	5.3V
2	9V
3	2.3V
4	0V

Q310

B	6.7V
C	9V
E	6V

Q901

B	12.5V
C	9.2V
E	13.2V

Q311

B	6V
C	0V
E	6.7V

Q312

D	8.9V
G	5.1V
S	4.2V

Q307

B	8.2V
C	8.8V
E	7.6V

Q306

B	8.6V
C	8.2V
E	8.8V

Q301

B	2.7V
C	5.6V
E	3.2V

Q302

B	−48.5V
C	−45V
E	−48.6V

Q304

B	8.9V
C	8.9V
E	8.9V

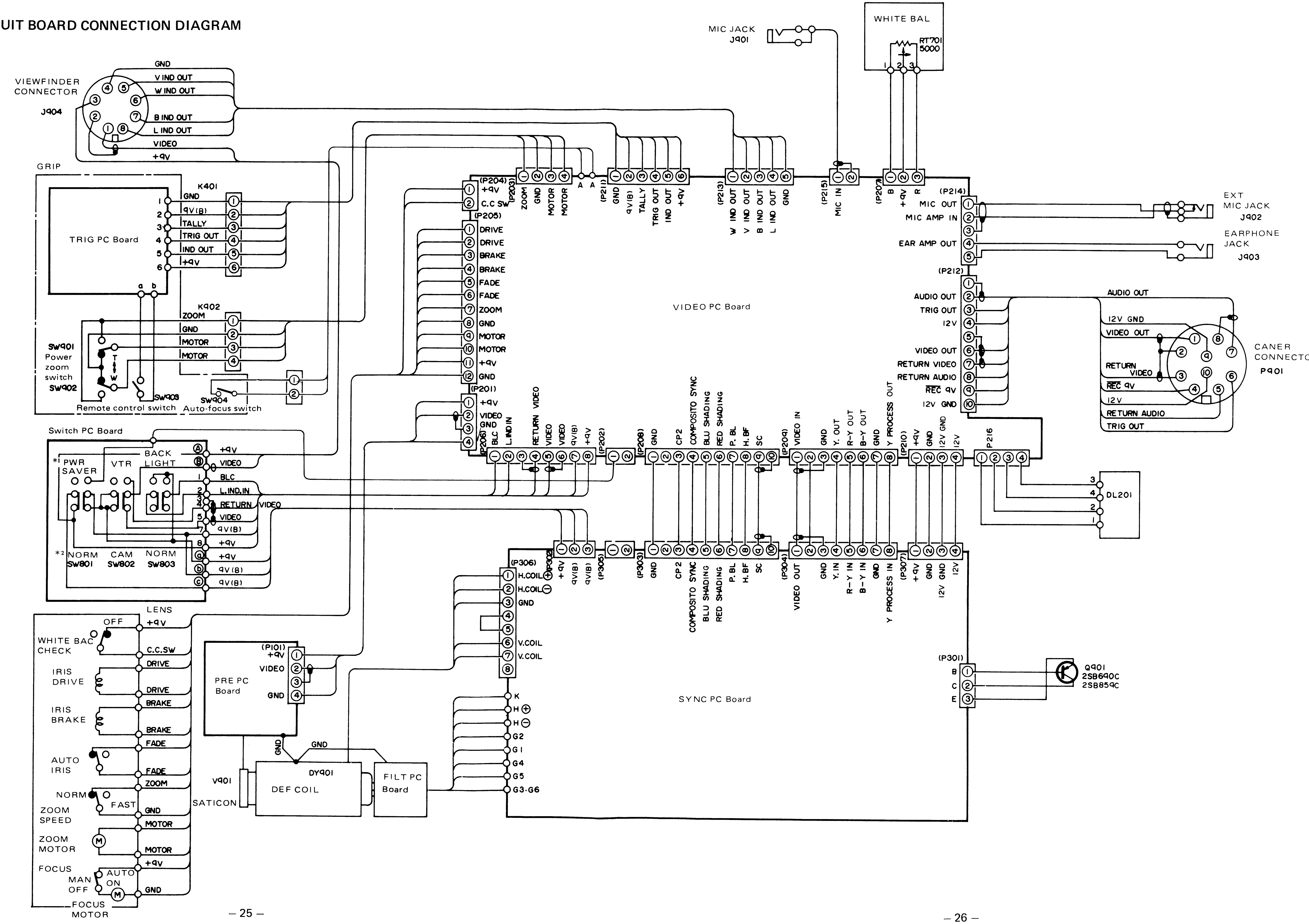
Q308

B	7.9V
C	0V
E	4.8V

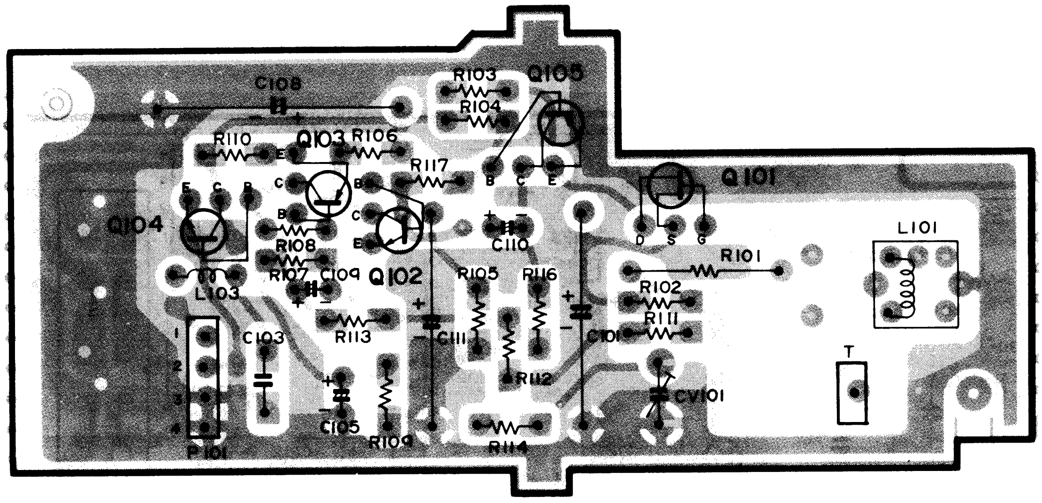
Q309

B	0.4V
C	6V
E	0V

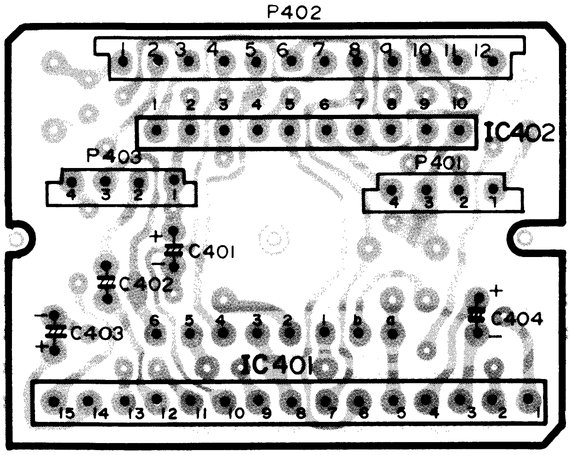
CIRCUIT BOARD CONNECTION DIAGRAM


VIEWFINDER CONNECTOR
J904
GND
V IND OUT
W IND OUT
B IND OUT
L IND OUT
VIDEO
+9V
GRIP
TRIG PC Board
K401
GND
9V(B)
TALLY
TRIG OUT
IND OUT
+9V
K902
ZOOM
GND
MOTOR
MOTOR
SW901
Power zoom switch
SW902
T
W
SW903
Remote control switch
SW904
Auto-focus switch
Switch PC Board
*1 PWR SAVER
VTR
BACK LIGHT
+9V
VIDEO
BLC
L.IND.IN
RETURN VIDEO
VIDEO
9V(B)
+9V
+9V
9V(B)
9V(B)
*2 NORM SW801
CAM SW802
NORM SW803
LENS
OFF
WHITE BAC CHECK
+9V
C.C.SW
IRIS DRIVE
DRIVE
DRIVE
IRIS BRAKE
BRAKE
BRAKE
FADE
AUTO IRIS
FADE
ZOOM
NORM
FAST
ZOOM SPEED
GND
MOTOR
ZOOM MOTOR
MOTOR
+9V
FOCUS
MAN OFF
AUTO ON
GND
FOCUS MOTOR
PRE PC Board
(P101)
+9V
VIDEO
GND
V901
SATICON
DEF COIL
DY901
GND
FILT PC Board
MIC JACK
J901
WHITE BAL
RT701 5000
(P204)
+9V
C.C SW
(P205)
DRIVE
DRIVE
BRAKE
BRAKE
FADE
FADE
ZOOM
GND
MOTOR
MOTOR
+9V
GND
(P201)
+9V
VIDEO
GND
(P203)
ZOOM
GND
MOTOR
MOTOR
A
A
(P211)
GND
9V(B)
TALLY
TRIG OUT
IND OUT
+9V
(P213)
W IND OUT
V IND OUT
B IND OUT
L IND OUT
GND
(P215)
MIC IN
(P207)
B
+9V
R
(P214)
MIC OUT
MIC AMP IN
EAR AMP OUT
(P212)
AUDIO OUT
TRIG OUT
12V
VIDEO OUT
RETURN VIDEO
RETURN AUDIO
REC 9V
12V GND
VIDEO PC Board
EXT MIC JACK
J902
EARPHONE JACK
J903
AUDIO OUT
12V GND
VIDEO OUT
RETURN VIDEO
REC 9V
12V
RETURN AUDIO
TRIG OUT
CANER CONNECTO
P901
(P206)
BLC
L.IND IN
RETURN VIDEO
VIDEO
VIDEO
9V(B)
+9V
(P202)
(P208)
GND
CP2
COMPOSITO SYNC
BLU SHADING
RED SHADING
P. BL
H. BF
SC
(P209)
VIDEO IN
GND
Y. OUT
R-Y OUT
B-Y OUT
GND
Y PROCESS OUT
(P210)
+9V
GND
12V GND
12V
P216
DL201
(P306)
H.COIL⊕
H.COIL⊖
GND
V.COIL
V.COIL
(P302)
+9V
9V(B)
9V(B)
(P305)
(P303)
GND
CP2
COMPOSITO SYNC
BLU SHADING
RED SHADING
P. BL
H. BF
SC
(P304)
VIDEO OUT
GND
Y. IN
R-Y IN
B-Y IN
GND
Y PROCESS IN
(P307)
+9V
GND
12V GND
12V
K
H⊕
H⊖
G2
G1
G4
G5
G3·G6
(P301)
B
C
E
Q901
2SB640C
2SB859C
SYNC PC Board

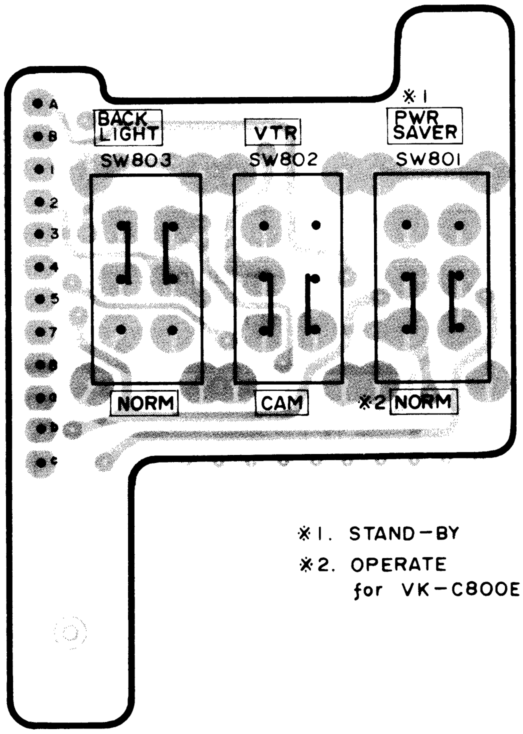
Pre-amp PC Board


C108
R103
Q105
R104
R110
Q103
R106
R117
Q101
E C B
Q104
B
R108
C
E
Q102
C110
D S G
R101
L101
R107
C109
L103
R105
R116
R102
R111
1
2
3
4
C103
R113
C111
C101
T
R112
CV101
C105
R109
R114
P101

Trigger PC Board


P402
1 2 3 4 5 6 7 8 9 10 11 12
IC402
P403
P401
4 3 2 1
C401
C402
C403
C404
6 5 4 3 2 1 b a
IC401
15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

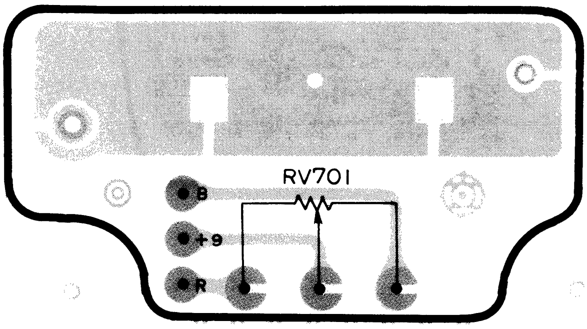
Operation Switch PC Board


A
B
1
2
3
4
5
7
BACK LIGHT
SW803
VTR
SW802
※1
PWR SAVER
SW801
NORM
CAM
※2
NORM

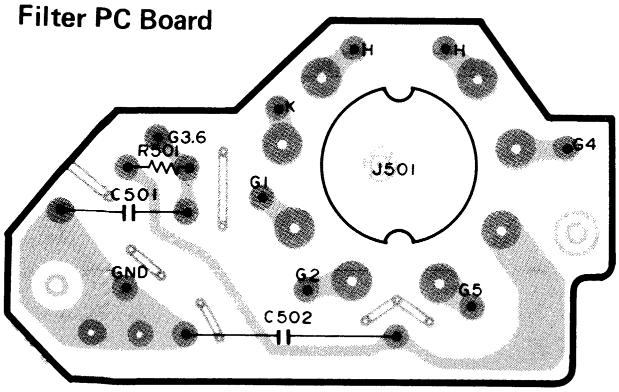
※1. STAND-BY

※2. OPERATE
for VK-C800E

White balance PC Board



Filter PC Board


H
H
K
G3.6
R501
C501
G1
J501
G4
GND
G2
G5
C502

Q101

D	4.3V
G	0.7V
S	1V

Q102

B	3.7V
C	8V
E	3V

Q103

B	8V
C	5.8V
E	8.8V

Q104

B	5.8V
C	8.9V
E	5.1V

Q105

B	3.7V
C	1.7V
E	4.7V

IC401

1	0V (9V)
2	0V
3	9V (0V)
4	8.8V
5	9V
6	0V
7	0V
8	0V
9	1.4V
10	0V
11	0V
12	0.6V
13	1.4V
14	4.8V
15	9V

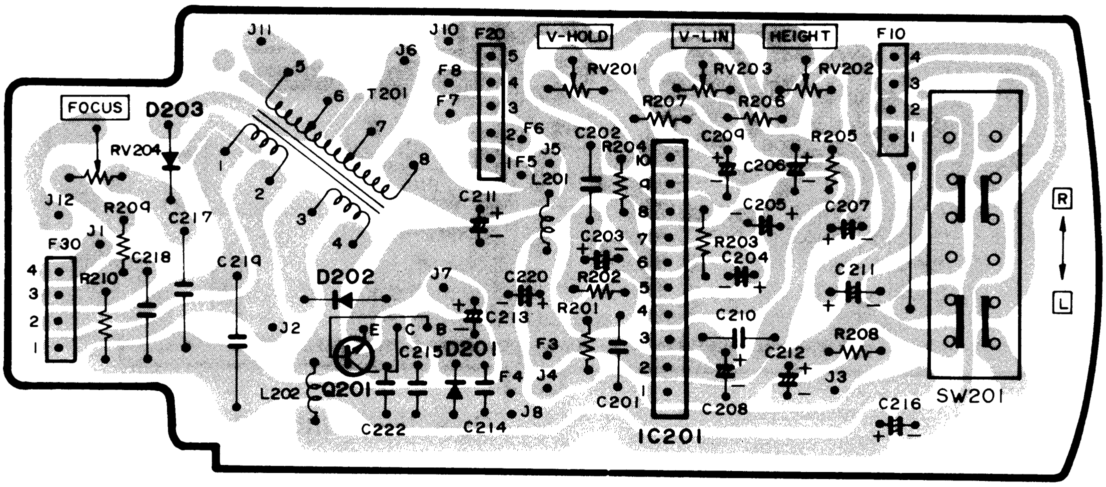
( ) : Pause

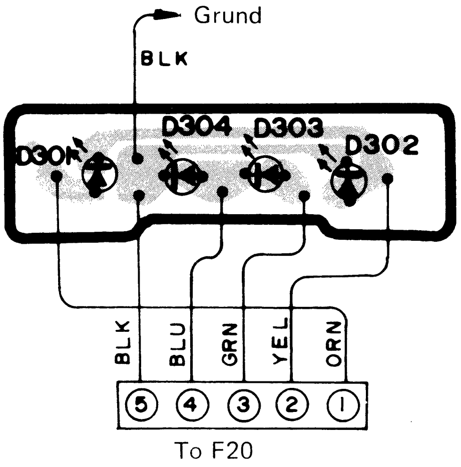
IC402

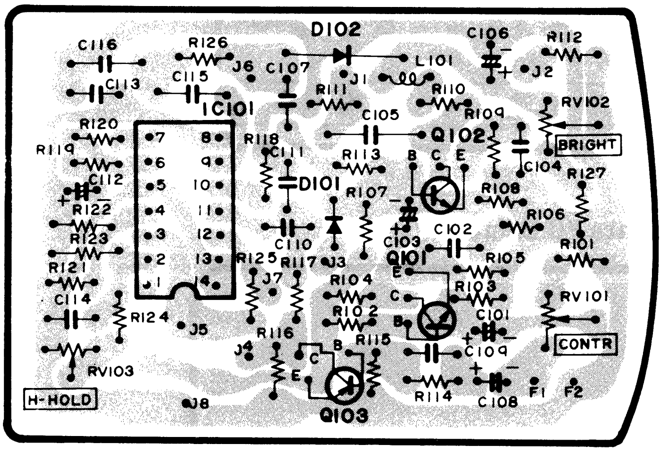
1	4.5V
2	9V
3	0V
4	0V (8V)
5	0V
6	0V
7	8.4V (0V)
8	0V (8.4V)
9	9V
10	0V

( ) : Pause

VIEWFINDER CIRCUIT BOARD DIAGRAM


FOCUS
D203
RV204
J12
R209
J1
C218
F30
R210
C217
C219
J11
T201
J6
J10
F20
F8
F7
F6
J5
F5
L201
C211
D202
J7
J2
Q201
L202
C215
D201
C213
C220
C222
C214
F4
J4
J8
F3
V-HOLD
RV201
R207
C202
R204
C203
R202
R201
C201
IC201
V-LIN
RV203
HEIGHT
RV202
R206
C209
C206
R205
C205
C207
R203
C204
C210
C212
C208
R208
J3
C211
C216
F10
SW201
R
L


Grund
BLK
D301
D304
D303
D302
BLK
BLU
GRN
YEL
ORN
⑤
④
③
②
①
To F20


C116
R126
D102
C106
R112
C113
C115
J6
C107
J1
L101
J2
IC101
R111
R110
R109
RV102
R120
R118
C105
Q102
BRIGHT
R119
C111
R113
C104
R127
C112
D101
R107
R108
R122
R106
R123
C110
C103
C102
R101
R121
R125
R117
J3
Q101
R105
J7
R104
R103
C114
R124
J5
R102
RV101
R116
R115
C101
J4
C109
CONTR
RV103
C108
R114
F1
F2
H-HOLD
J8
Q103

IC101

1	–	14	0V
2	2.7V	13	0V
3	9V	12	1.9V
4	5.3V	11	–0.6V
5	0V	10	1.4V
6	2.9V	9	–
7	2.9V	8	4.2V

IC102

1	4.5V
2	9V
3	8.7V
4	6.2V
5	0.6V
6	2.3V
7	3.7V
8	0V
9	4.5V
10	9V

Q101

B	1.6V
C	3.7V
E	1V

Q102

B	2.8V
C	2.1V
E	2.2V

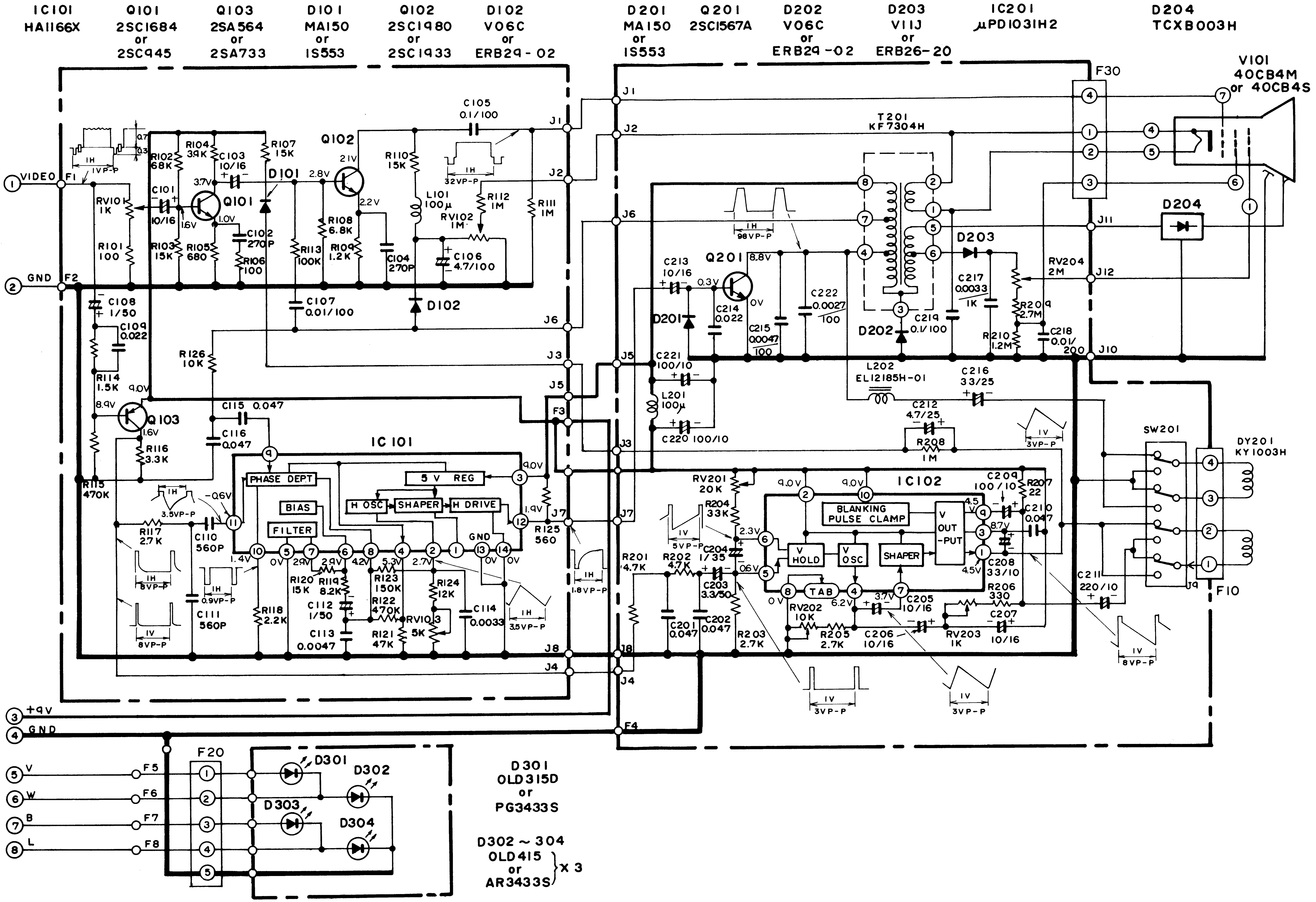
Q103

B	8.9V
C	1.6V
E	9V

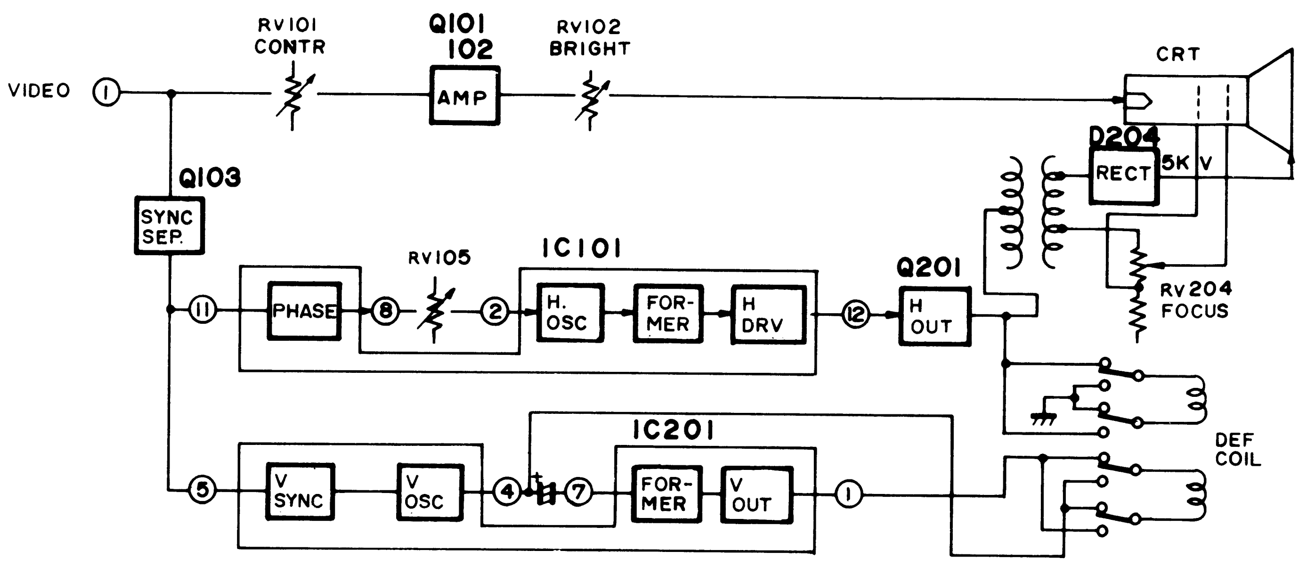
Q201

B	0.3V
C	8.8V
E	0V

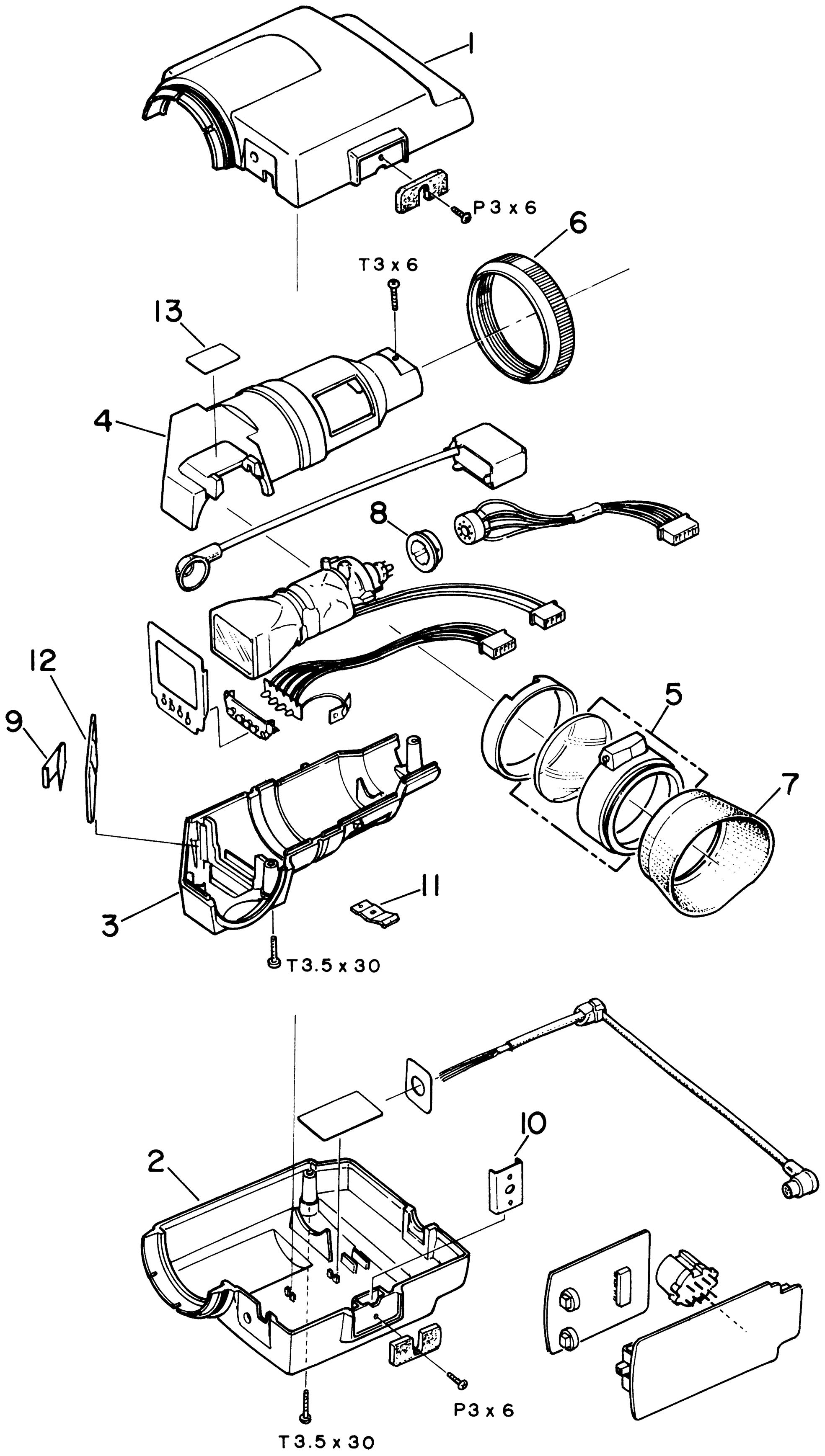
VIEW FINDER CIRCUIT DIAGRAM


IC101 HA1166X
Q101 2SC1684 or 2SC945
Q103 2SA564 or 2SA733
D101 MA150 or 1S553
Q102 2SC1980 or 2SC1933
D102 V06C or ERB29-02
D201 MA150 or 1S553
Q201 2SC1567A
D202 V06C or ERB29-02
D203 V11J or ERB26-20
IC201 μPD1031H2
D204 TCXB003H
V101 40CB4M or 40CB4S
T201 KF7304H
DY201 KY1003H
SW201
F10
F20
F30
IC 101
IC102
PHASE DEPT
5 V REG
BIAS
H OSC
SHAPER
H DRIVE
FILTER
GND
BLANKING PULSE CLAMP
V OUT-PUT
V HOLD
V OSC
TAB
① VIDEO
② GND
③ +9V
④ GND
⑤ V
⑥ W
⑦ B
⑧ L
L202 EL12185H-01
L101 100μ
L201 100μ
D301 OLD315D or PG3433S
D302 ~ 304 OLD415 or AR3433S } X 3
D301
D302
D303
D304
1H 1VP-P
1H 32VP-P
1H 98VP-P
1H 3.5VP-P
1H 8VP-P
1H 0.9VP-P
1V 8VP-P
1H 3.5VP-P
1H 1.8VP-P
1V 5VP-P
1V 3VP-P
1V 3VP-P
1V 3VP-P
1V 3VP-P
1V 8VP-P

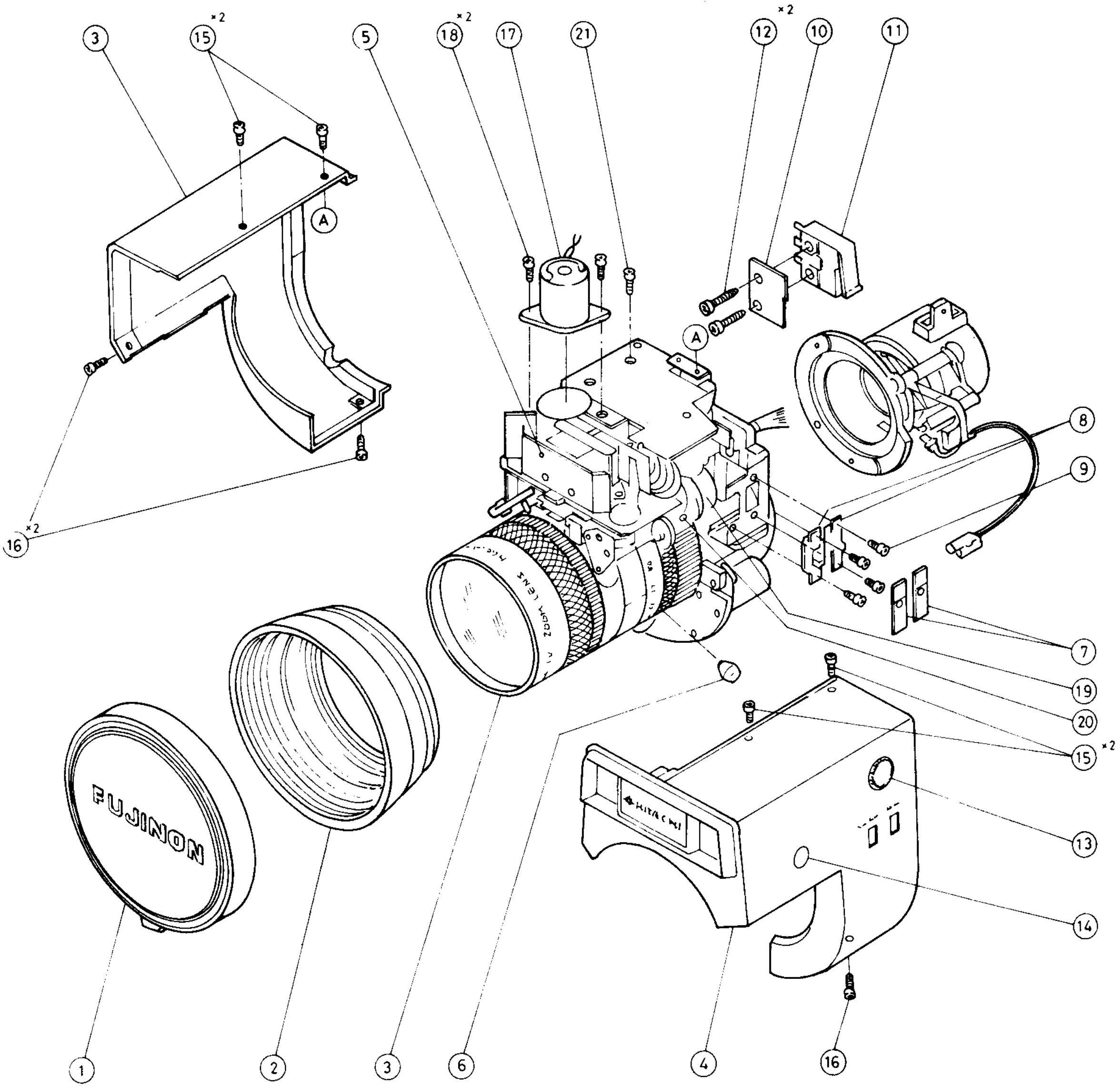
VIEWFINDER BLOCK DIAGRAM

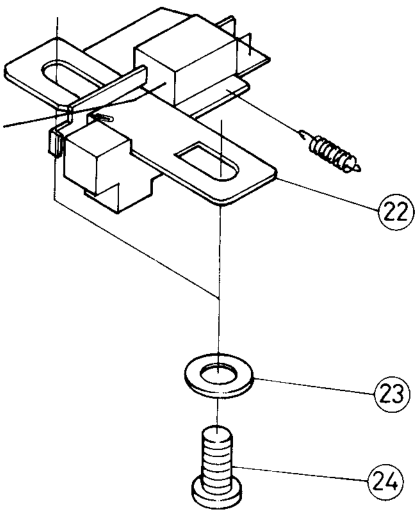

VIDEO ①
RV101
CONTR
Q101
102
AMP
RV102
BRIGHT
CRT
D204
RECT
5K V
Q103
SYNC SEP.
RV105
IC101
PHASE
⑪
⑧
②
H. OSC
FOR-MER
H DRV
⑫
Q201
H OUT
RV204
FOCUS
DEF
COIL
IC201
⑤
V SYNC
V OSC
④
⑦
FOR-MER
V OUT
①

EXPLODED VIEW (Viewfinder)


1
P3 x 6
6
T3 x 6
13
4
8
12
9
5
7
11
3
T3.5 x 30
10
2
P3 x 6
T3.5 x 30

EXPLODED VIEW (Auto-focus unit)


③
⑮ ×2
⑤
⑱ ×2
⑰
㉑
⑫ ×2
⑩
⑪
Ⓐ
Ⓐ
⑧
⑨
⑯ ×2
⑦
⑲
⑳
⑮ ×2
⑬
⑭
FUJINON
HITACHI
ZOOM LENS
①
②
③
⑥
④
⑯

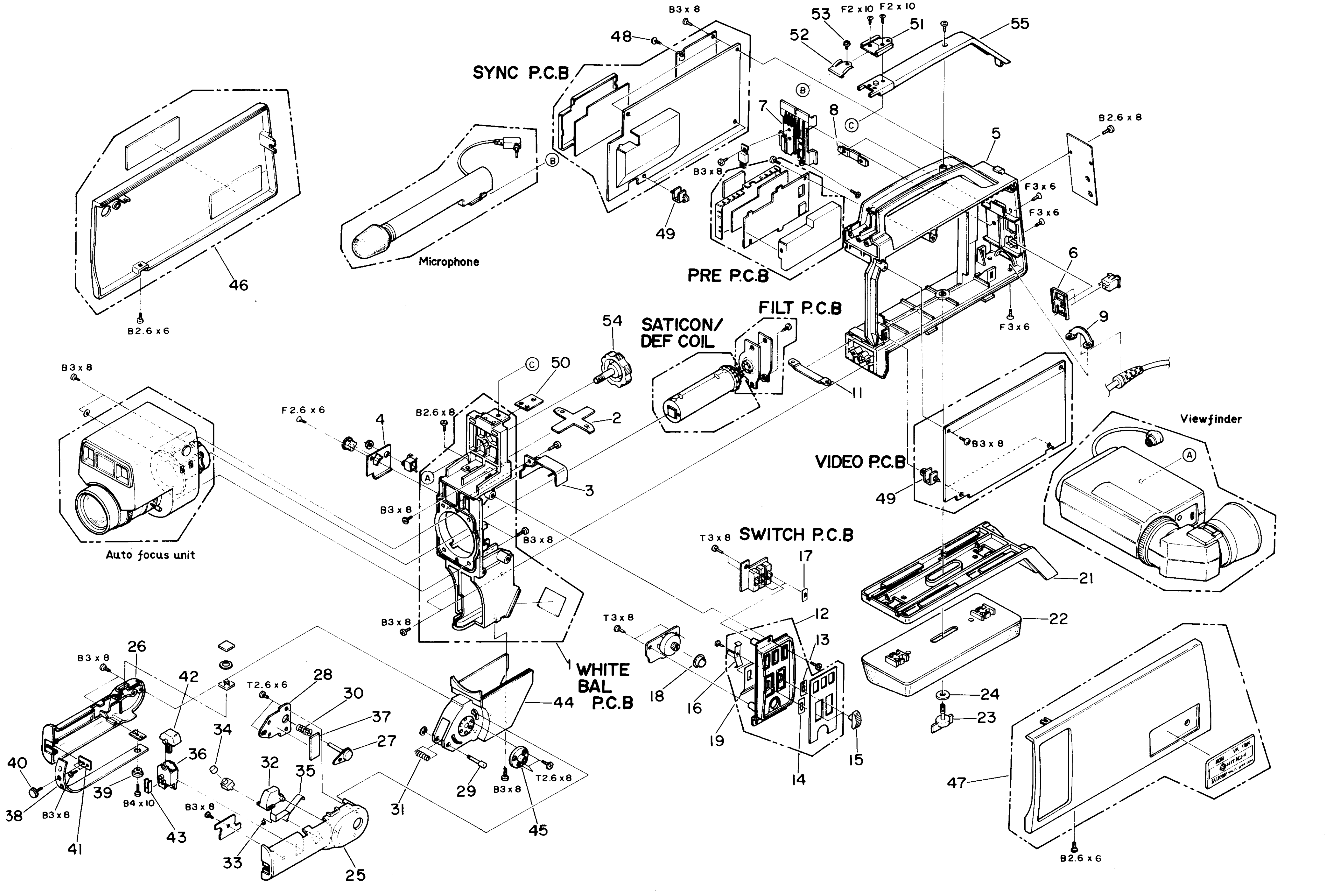


REPLACEMENT PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		CAPACITORS
CV101	5058292	TRIMMER
		RESISTORS
RV202	5007403	SEMI VARIABLE 1KOHM
RV205	5007404	SEMI VARIABLE
RV206-211	5007403	SEMI VARIABLE 1KOHM
RV217-218	5007404	SEMI VARIABLE
RV219	5007406	SEMI VARIABLE 20KOHM
RV301	5007352	SEMI VARIABLE 500KOHM
RV302	5008439	VARIABLE RESISTOR 1M OHM
RV304	5007401	SEMI VARIABLE 500OHM
RV305	5007402	SEMI VARIABLE 2KOHM
RV323	5007408	SEMI VARIABLE 1KOHM
RV701	5000881	VARIABLE
VR101	5007424	SEMI VARIABLE 1KOHM
VR102	5007425	SEMI VARIABLE 1MOHM
VR103	5007427	SEMI VARIABLE 5KOHM
VR201	5007423	SEMI VARIABLE 20KOHM
VR202	5007422	SEMI VARIABLE 10KOHM
VR203	5007421	SEMI VARIABLE 1KOHM
VR204	5007426	SEMI VARIABLE 2MOHM
		SEMI-CONDUCTORS
D201-203	5330573	DIODE 1S2473
D204	5331631	DIODE TCX8003H
D301	5331571	DIODE 1SS83
D302-303	5330573	DIODE 1S2473
D304	5330771	DIODE SILICON 1SV55 10KHZ 250MW
D306	5330573	DIODE 1S2473
D308	5330573	DIODE 1S2473
IC101	5352551	IC HA1166X
IC201	5352555	IC MPC1031H2
IC204	5351847	IC ZC-0229X
IC205	5351848	IC ZC-0235X
IC206-209	5351824	IC HA11732
IC210	5351822	IC AN614
IC211	5351823	IC MPC596C
IC212	5352554	IC HA17741PS
IC213	5351822	IC AN614
IC214	5351823	IC MPC596C
IC215	5351849	IC ZC-0231X
IC216	5351851	IC ZC-0240X
IC217	5351822	IC AN614

SYMBOL-NO	P-NO	DESCRIPTION
		SEMI-CONDUCTORS
IC218	5351823	IC MPC596C
IC219	5351682	IC ZC0226
IC220	5351689	IC LA4140
IC221	5351852	IC ZC-0238A
IC222	5351853	IC ZC-0236AX
IC223	5351854	IC ZC-0239X
IC224	5351855	IC ZC-0246
IC303	5352553	IC MPC305C
IC304	5365616	IC HD14050B
IC305	5351686	IC HD440071
IC306	5351688	IC HA11720
IC307	5351821	IC AN608P
IC308	5351857	IC ZC-0233X
IC309	5351858	IC ZC-0234X
IC311	5352552	IC MPC301AC
IC312	5351858	IC ZC-0234X
IC401	5351859	IC ZC-0237X-1
IC402	5351831	IC ZC-0237X-2
Q101	5322641	TRANSISTOR 2SC1684
Q101	5322761	TRANSISTOR 2SK218Q
Q102	0573481	TRANSISTOR SILICON 2SC458 230M
Q102	5322644	TRANSISTOR 2SC1980
Q103	5321251	TRANSISTOR SILICON 2SA844C 200MHZ 200MW
Q103	5322645	TRANSISTOR 2SA564
Q104	0573481	TRANSISTOR SILICON 2SC458 230M
Q105	5321251	TRANSISTOR SILICON 2SA844C 200MHZ 200MW
Q201	5320623	TRANSISTOR SILICON 2SC1213A-C 80MHZ 400M
Q201	5322643	TRANSISTOR 2SC1567A
Q301	0573481	TRANSISTOR SILICON 2SC458 230M
Q302	5322234	TRANSISTOR 2SC1890A-F
Q304	5322248	TRANSISTOR 2SA1015Y
Q307	0573481	TRANSISTOR SILICON 2SC458 230M
Q308	5322248	TRANSISTOR 2SA1015Y
Q309	5322238	TRANSISTOR 2SD781
Q310	0573481	TRANSISTOR SILICON 2SC458 230M
Q311	5322248	TRANSISTOR 2SA1015Y
Q312	5322235	TRANSISTOR 2SK117BL

EXPLODED VIEW (Camera)



SYNC P.C.B
PRE P.C.B
FILT P.C.B
SATICON/
DEF COIL
VIDEO P.C.B
SWITCH P.C.B
WHITE
BAL
P.C.B
Microphone
Auto focus unit
Viewfinder
B3 x 8
B2.6 x 6
B2.6 x 8
F2 x 10
F2 x 10
F3 x 6
F2.6 x 6
T3 x 8
T2.6 x 6
T2.6 x 8
B4 x 10
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HITACHI

SYMBOL-NO	P-NO	DESCRIPTION
		TRANSFORMERS
T301	5270255	TRANSFORMER
T302	5270254	TRANSFORMER
		COILS
L101	5120781	COIL
L101	5152355	COIL
L103	5152354	COIL
L201	5152355	COIL
L202	5152356	COIL
L202-203	5152351	COIL
L204	5152353	COIL
L205	5152352	COIL
L206	5152353	COIL
L207	5152352	COIL
L210	5152353	COIL
L301	5150616	COIL
L303	5150618	COIL
		CRYSTALS
X301	5780477	CRYSTAL (E)
	5780476	CRYSTAL (U)
		MISCELLANEOUS
	5162061	LOW PASS FILTER
	5162062	BAND PASS FILTER
	5270278	FILTER (U)
	5310591	SATICON (TM)
	5421711	MICROPHONE
	5603481	SWITCH
	5622012	SWITCH
	5659274	VIDICON SOCKET
DL201	5270275	DELAY LINE
DL202	5270276	DELAY LINE
DL203	5270277	DELAY LINE
DL204	5270275	DELAY LINE
DY201	5272051	COIL ASSEMBLY
		MISCELLANEOUS
F201	5721187	FUSE
J501	5659275	SOCKET
J901-902	5672061	MIC JACK
J903	5672121	JACK
J904	5898931	CONNECTOR

SYMBOL-NO	P-NO	DESCRIPTION
		MISCELLANEOUS
SW201	5622011	SWITCH
SW903	5633761	SWITCH
SW904	5633751	SWITCH
T201	5271041	FLYBACK TRANSFORMER
		FOR FINAL ASSEMBLY (Camera)
1	7042422	CHASSIS-LENS (U)
1	7042423	CHASSIS-LENS (E)
3	6863991	COVER-FILTER
5	6864031	CHASSIS-P.C.B
6	7470801	HOLDER-MIC JACK
9	7373091	HOLDER-CABLE
10	6634391	NAME PLATE
12	6690462	PANEL-OPERATE
15	6290881	KNOB
16	6535181	SPRING
17	6634411	SWITCH COVER
18	6288491	KNOB
22	6862211	PAD
23	6290861	SCREW
24	7787841	WASHER
25	6863131	GRIP A
26	6863141	GRIP B
27	6053921	BUTTON
28	7374501	PLATE
29	7551381	PIN
30	6520161	SPRING
31	6520151	SPRING
32	6060301	BUTTON
33	6590021	CUSHION-BUTTON
34	6864011	CUSHION-SWITCH
36	9999999	HOLDER-SWITCH
38	7753101	STRAP GRIP
34	6862311	SPACER
40	6862291	SCREW
41	7790331	NUT
42	6862201	SWITCH
43	6534301	SPRING
44	6864021	GRIP BASE
45	7593081	BEARING
46	6105242	SIDE COVER (R)
47	6104592	SIDE COVER (L)
48	6864001	CRIP

SYMBOL-NO	P-NO	DESCRIPTION
		FOR FINAL ASSEMBLY
49	6337471	HINGE-P.C.B
50	7373051	NUT
51	7373061	SHOE-ACCESSORY
52	6534321	SPRING
53	7551391	SCREW
54	6290871	KNOB
55	6862301	COVER
56	6054411	BUTTON
57	6535061	SPRING
		FOR FINAL ASSEMBLY (Viewfinder)
1	6105261	CABINET (A)
2	6105271	CABINET (B)
3	6105251	COVER-CRT
4	6862282	COVER
5	6959531	LENS
6	6862271	LING
7	6589671	RUBBER
8	6587181	RUBBER
9	6534311	SPRING
11	6534331	SPRING
13	4605712	LAVEL-VF
		FOR FINAL ASSEMBLY (Auto-focus unit)
1	6862711	CAP
2	6589731	HOOD
3	6862721	COVER (R)
4	6862701	COVER (L)
5	5490031	A.F UNIT
6	7552281	LEVER
7	6634691	COVER
8	5623981	SWITCH
9	7782083	SCREW 2X2
10	7373331	PLATE
11	5601231	SWITCH
12	7782081	SCREW 1.4X5
13	6570351	CAP
14	6589741	CAP
15	7782086	SCREW 2X3
16	7782084	SCREW 2X6
17	5490011	MOTOR

SYMBOL-NO	P-NO	DESCRIPTION
		FOR FINAL ASSEMBLY
18	7782083	SCREW 2X2
19	5490021	MOTOR
20	7782085	SCREW 1.4X3.5
21	7782071	SCREW
22	5603501	SWITCH
23	7787851	WASHER
24	7782082	SCREW 1.7X2

HITACHI SERVICE MANUAL

TK | No. 1536E

VK-C800(U·C)·E

Adjustment

VK–C800 (U. C.)

VK–C800E

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

COLOR VIDEO CAMERA

April 1981 **TOKAI WORKS**

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Before starting adjustment

Check the following before starting adjustment.

1. Connection

Connect between camera and power supply, TV set, etc.

2. Tools and measuring instruments used for adjustment

- Measuring instruments
  Oscilloscope, frequency counter, DC voltmeter
- Tools, etc.
  (+) screwdriver (big and middle size), adjusting screwdriver, soldering iron, color viewer (3100°K), test chart A, grey scale chart (11 steps), color bar chart, resistors (4.7 kΩ, 1/8W or 1/4W), scale which can measure up to 2m, tripod, fluorescent lamp (stand or ceiling lamp is acceptable. However, distance to camera should be approx. 2m), TV set

3. Preparation

Set distance between camera lens and color viewer to 2m.

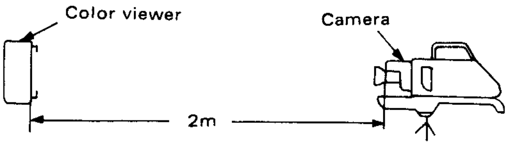


Fig. 1

- Camera operation switch positions
  Focus: MAN, Zoom speed: NORM (not related to adjustment), PWR SAVER (PWR SAVER during preparation, NORM during adjustment), CAM, NORM, INDOOR, OFF, WHITE BAL: Mechanical centers.
- Install the viewfinder when adjusting the indicator level. Remove the mike.
- Perform adjustment with the time axis of the oscilloscope to the H period (horizontal period), when otherwise specified. Set to the V period when specified, and to H period when it is specified.

Note: Set the power save switch to "NORM" and then set the color viewer switch to ON for starting adjustment.
Be sure to observe this procedure. When it is done in the wrong order, burning of the SATICON may occur.

Adjustment after replacing SATICON/deflection coil ass'y

1. Adjusting beam voltage

RV302 (BEAM): Sync PC Board

1) Place the fluorescent lamp approx. 2m away from the lens surface.
2) Shoot the fluorescent lamp perpendicularly. (Shoot it as shown in Fig. 2 viewed from the back of the camera.)

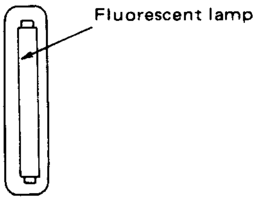


Fig. 2

3) Adjust the zoom to the widest angle.
4) Connect the oscilloscope to TP1 of the video PC Board.
5) Adjust RV302 so that the level of the waveform is 0.75Vp-p ± 0.05V.

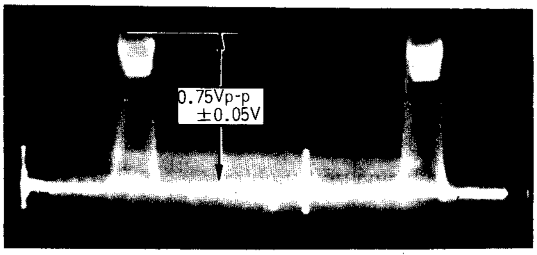


Fig. 3

2. Adjusting field focus

RV301 (FOC), Sync PC Board

1) Shoot the color viewer without the chart attached to it.
2) Adjust the zoom so that the ends of the color viewer are in contact with the edges of the TV screen.
3) Connect the oscilloscope to TP2 of the video PC Board.
4) Adjust RV301 so that the waveform is flat or the ratio of the max. amplitude and min. amplitude is 2:1 during the video period of the waveform.

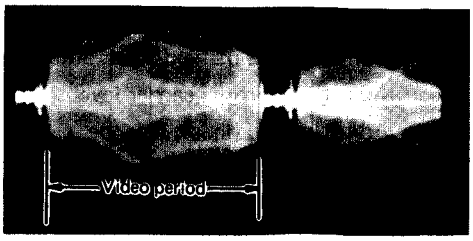


Fig. 4

3. Adjusting back-focus and horizontal

- Back-focus

1) Insert the test chart A into the color viewer.
2) Adjust the zoom to max. telephoto and adjust focus by turning the focus adjust ring.
3) Set to widest angle, and loosen the deflection coil fixing screw.
4) Move the deflection coil backward/forward to focus. (Set the power switch of the viewer to OFF.)
5) Set to max. telephoto again, and adjust focus by turning the focus adjust ring. (Set the power switch of the viewer to ON.)
6) Adjust max. telephoto and wide angle repeatedly so that it is focused at both telephoto and wide angle.
7) Next, adjust horizontal.

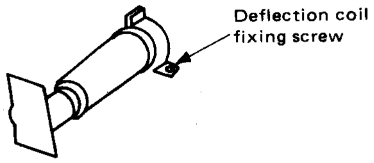


Fig. 7

- Horizontal

1) Check horizontal of the camera and chart.
(Check horizontal of the camera placed on the repair bench or the tripod, and the chart placed on the repair bench visually.)
2) Turn the deflection coil to adjust so that the chart on the TV screen is horizontal.
(It is acceptable to adjust the zoom so that the edges of the chart on the TV screen do not exceed the TV picture, or turn the vertical hold control of the TV set to the horizontal blanking period appears on the screen, and match the chart and the horizontal blanking period so they are parallel. Return the vertical hold control after adjustment.)
3) Check the back-focus. Adjust when there is drift.
(Check that it is focused at max. telephoto and wide angle. Be sure to check horizontal when back-focus is adjusted.)
4) Tighten the deflection coil fixing screw.

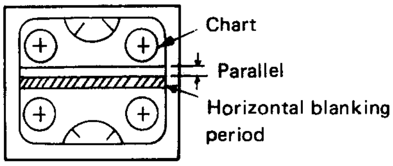


Fig. 8

4. Adjusting vertical position

RV321 (VCT): Sync PC Board

1) Either use the chart or not.
2) Adjust the vertical hold control of the TV set so the horizontal blanking period appears on the screen.
3) Adjust RV321 so that the optical black mask overlaps the horizontal blanking period.
4) Return the vertical hold control of the TV set.

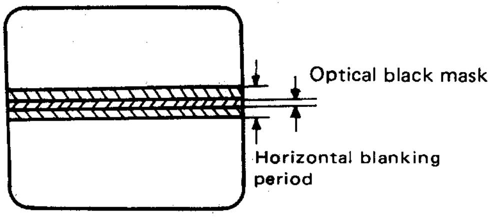


Fig. 9

5. Adjusting horizontal size

RV323 (HCT), 324 (WID): Sync PC Board

1) Shoot the color viewer without inserting the chart.
2) Adjust TV screen.
3) Connect the oscilloscope to TP22 of the video PC Board.
4) Turn RV324 counterclockwise to make the width of the picture narrower.
5) Adjust the position using RV323, and the width using RV324 so that the waveform shown in Fig. 10 is obtained.
This is the waveform with a little of the optical black mask remaining at both ends of the video period.

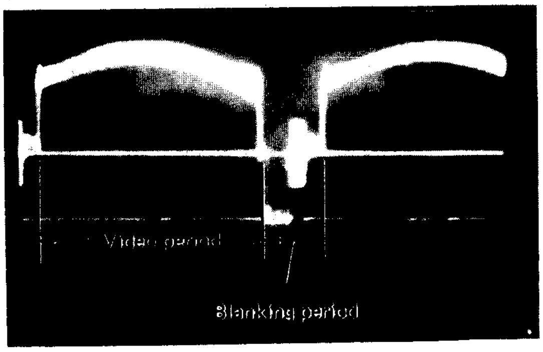


Fig. 10

6. Adjusting vertical size, linearity

RV320 (HGT), RV322 (HLN), RV319 (VLN): Sync PC Board

1) Insert chart A into the color viewer and bring it into focus.
2) Adjust the zoom so that the chart A fills the TV screen.

3) Adjust height using RV320, vertical linearity, by RV322 and horizontal linearity by RV319 so that the circle in the chart on the screen is round.

7. Adjusting chroma carrier level

RV202 (CCL): Video PC Board

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect the oscilloscope to TP3 of video PV Board.
4) Adjust RV202 to set it to 50mVp-p ± 5mV.

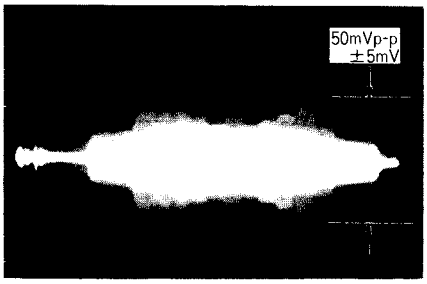


Fig. 11

8. Adjusting red phase, balance

RV203 (RPS), RV211 (R BAL): Video PC Board

1) Insert the color bar chart into the color viewer and bring it into focus.
2) Adjust the zoom so that the color bar chart fills the TV screen.
3) Connect the oscilloscope to TP4 of the video PC Board.
4) Repeatedly turn RV203 and RV211 to minimize the blue level of the waveform.

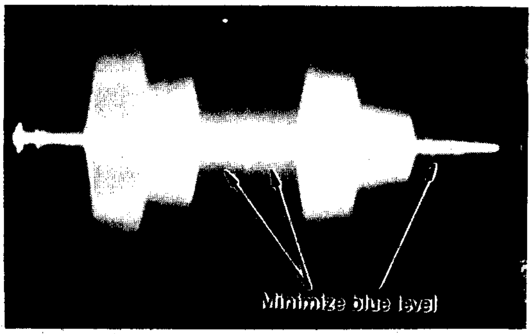


Fig. 12

9. Adjusting blue phase, balance

RV204 (BPS), RV213 (B BAL): Video PC Board

1) Insert the color bar chart into the color viewer and bring it into focus.
2) Adjust the zoom so that the color bar chart fills the TV screen.
3) Connect the oscilloscope to TP7 of the video PC Board.
4) Repeatedly turn RV204 and RV213 to minimize the red level of the waveform.

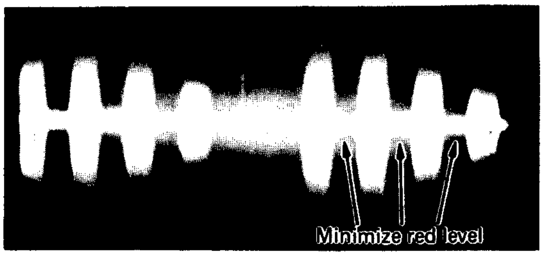


Fig. 13

10. Adjusting red/modulation shading

RV308 (RVP), RV310 (RVS), RV312 (RHP), RV314 (RHS). Sync PC Board

1) Shoot the color viewer without inserting a chart.
2) Adjust the zoom so that the viewer fills the TV screen.
3) Connect the oscilloscope to TP16 of the video PC Board.
4) Repeatedly turn RV308 and RV310 so that the vertical (V) period is flat.

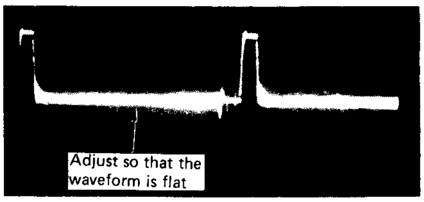


Fig. 14

5) Repeatedly turn RV312 and RV314 so that the horizontal (H) period as flat as possible.

11. Adjusting blue/modulation shading

RV307 (BVP), RV309 (BVS), RV311 (BHP), RV313 (BHS): Sync PC Board.

1) Adjust in the way same as the red/modulation shading adjustment in item 10). Connect the oscilloscope to TP17 of the video PC Board, and adjust the V period using RV307, RV309, and H period, using RV311, RV-313.

12. Y set-up

RV206 (Y SET): Video PC Board

1) Fit the lens cap to shut off incident light.
2) Connect the oscilloscope to TP22 of the video PC Board.
3) Adjust RV206 so that the set-up is 50mVp-p ± 10mV.

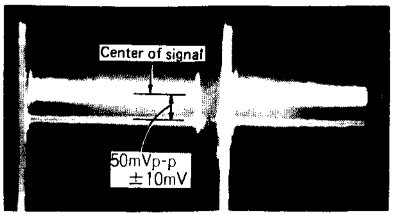


Fig. 15

13. R set-up

RV208 (R SET): Video PC Board

1) Fit the lens cap to shut off incident light.
2) Connect the oscilloscope to TP13 of the video PC Board.
3) Adjust RV208 so that the waveform (pedestal level) is 0.17Vp-p ± 0.5Vp-p.

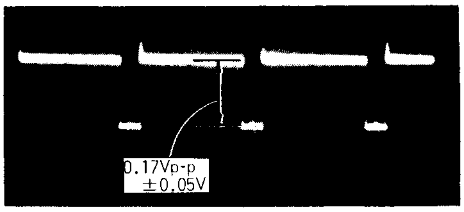


Fig. 16

14. Adjusting white balance

RV212 (RGN), RV214 (BGN), RV207 (Y_L SET), RV209 (B SET). Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect the oscilloscope to TP22 of the video PC Board.
4) Repeatedly turn RV212 and RV214 to minimize the signal at 6th ~ 9th waveforms from the bottom.
5) Repeat the adjustment of RV207, RV209 alternately to minimize the signal at 2nd ~ 6th waveforms from the bottom.

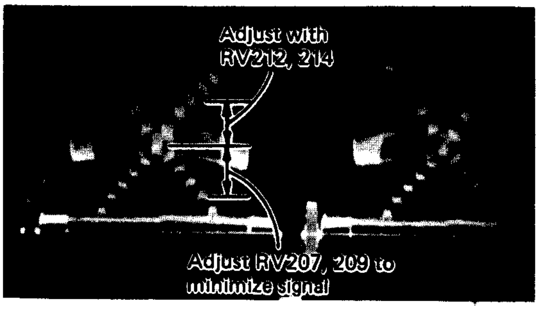


Fig. 17

15. Adjusting black balance

RV210 (Y_L BB): Video PC Board.

1) Fit the lens cap to shut off the incident light.
2) Connect the oscilloscope to TP22 of the video PC Board.
3) Adjust RV210 so that the carrier of the waveform is minimum.

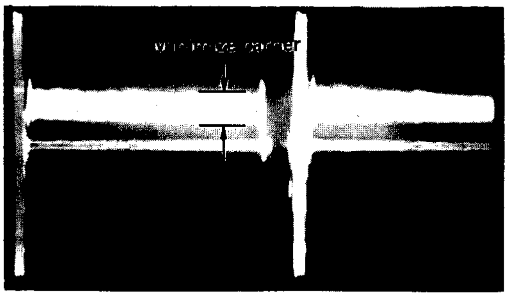
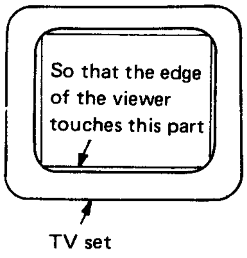
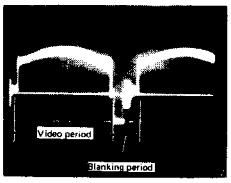
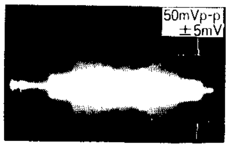
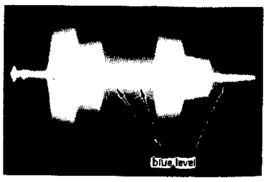


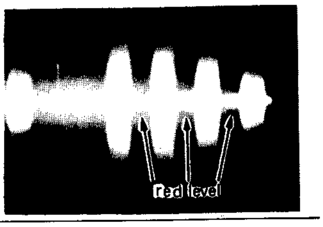
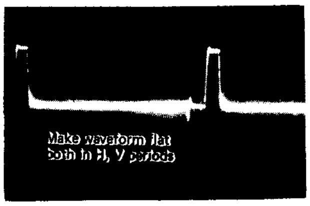
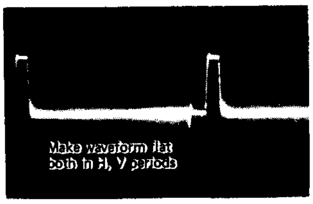
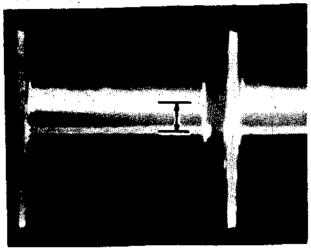
Fig. 18

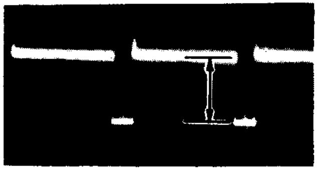
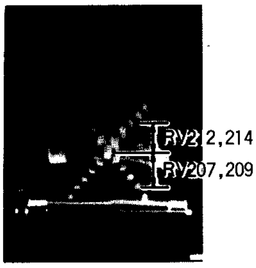
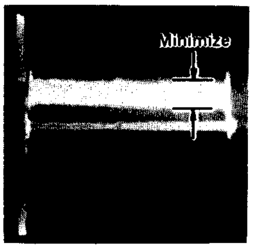
List of adjustments after replacing SATICON/deflection coil ass'y

Note: Items concerning the purpose of adjustment and phonomenon of picture in the table are shown in the order:
Circuit No., Purpose of adjustment & phenomenon of picture

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
1	Adjusting Beam voltage	RV302 (BEAM) Adjust the electron beam of SATICON while varying the G1 voltage. • When voltage is low, steps in the high luminance section (white) of the grey scale cannot be distinguished. • When voltage is high, magenta ghost appears to the right of the high luminance section of the grey scale. Or, the section becomes green (horizontally). Shading increases.	Video PC Board TP1	RV302 (BEAM)	Shoot fluorescent lamp 2m away at right angles. Set the waveform to 0.75Vp-p ± 0.05V
2	Field focus adjustment	RV301 (FOC) Set the focus electrode voltage of SATICON and adjust so that the electron beam from the cathode focuses on the photoconductive film. • It is badly focused when the focus ring is turned or the back-focus is adjusted using the coil ass'y.	Video PC Board TP2	RV301 (FOC)	Shoot the color viewer to fill the TV screen.  Set the waveform so it is flat; when not possible, set so that the ratio of the max, amplitude and min. amplitude is 2:1.
3	Back-focus, horizontal adjustment • Back-focus		TV picture	Deflection coil	Shoot test chart A. 1. Set the viewer power supply to ON. Adjust zoom to telephoto and focus. Loosen the deflection coil fixing screw. 2. Set the viewer power supply OFF. Adjust zoom to MAX. WIDE and move deflection coil backword and forward. Adjust so that both max. telephoto and max. wide angle are in focus.
	• Horizontal		TV picture	Deflection coil	Let the horizontal blanking period of the TV appear on the screen. Turn the deflection coil so that the chart edge and the blanking are parallel. Check the back-focus after adjustment.

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
4	Vertical position adjustment	RV321 (VCT) Vertical deflection position adjustment • Black mask appears at the top of the picture or, the transparent mask appears to the bottom of the picture.	TV picture	RV321 (VCT)	Let the horizontal blanking of the TV appear on the screen. Overlap the optical black mask and blanking period.
5	**Horizontal size adjustment**	RV324 (WID) Horizontal deflection size adjustment • The circle chart looks crushed. Color balance is not correct and becomes green. RV323 (HCT) Horizontal deflection position adjustment • Black mask appears to the left or right of the picture.	TV picture Video PC Board TP22	RV324 (WID) RV323 (HCT)	Shoot the color viewer to fill the screen. Turn RV324 counter-clockwise: To shorten the waveform width Turn RV323, RV324: To set black mask to approx. 1μsec on both left/right sides. 
6	Vertical size/ linearity adjustment	RV319 (VLN) Adjusts vertical deflection linearity • Circular chart is distorted. RV320 (HGT) Adjust vertical deflection size • Circular chart is distorted RV322 (HLN) Adjusts horizontal deflection linearity • Circular chart is distorted. Color unevenness appears on left and right.	TV picture	RV320 (HGT) RV322 (HLN) RV319 (VLN)	Shoot the test chart A to fill the screen. Alternately turn RV320, RV322, RV319 to make the chart circular.
7	Chroma carrier level adjustment	RV202 (CCL) Adjust chroma signal carrier level. • No color, tint abnormal	Video PC Board TP3	RV202 (CCL)	Shoot the grey scale to fill the screen Adjust the waveform level: Set to 50mVp-p ± 5mV. 
8	Red phase/balance adjustment	RV203 (RPS) Adjusts the phase shift angle for R separation in the R/B chroma separation circuit. • Color reproduction is not satisfactory and mixed color seen. RV211 (R. BAL) Adjusts the 1H delayed chroma signal carrier level to match it to the chroma signal carrier level of the output of the phase shifter. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP4	RV203 (RPS) RV211 (R. BAL)	Shoot the color bar chart to fill the screen. Alternately turn RV203 and RV211 to minimize blue level. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
9	Blue phase/balance adjustment	RV204 (BPS) Adjusts the carrier phase angle for separating B in the R/B color separation circuit. • Color reproduction is not satisfactory and mixed color occurs. RV213 (B BAL) Adjust corrier level to match it to the color signal carrier level of the phase shifter output. • Color satuation and purity are deteriorated and mixed color occurs.	Video PC Board TP7	RV204 (BPS) RV213 (B. BAL)	Shoot the color bar chart to fill the screen. Alternately turn RV204, RV213 to minimize the red level. 
10	Red/modulation shading adjustment	RV308 (RVP), RV310 (RVS), RV312 (RHP), RV314 (RHS) Correct color unevenness of R signal. • Color unevenness is too great.	Video PC Board TP16	V period: RV308 (RVP), RV310 (RVS) H period: RV312 (RHP), RV314 (RHS)	Shoot the color viewer to fill the screen. Turn R308, R310 alternately to make the waveform flat.  Turn RV312, RV314 alternately to make the waveform flat.
11	Blue/modulation shading adjustment	RV367 (BVP), RV309 (BVS), RV311 (BHP), RV313 (BHS) Correct color unevenness of B signal. • Color unevenness too great	Video PC Board TP17	V period: RV307 (BVP) RV309 (BCS) H period: RV311 (BHP) RV313 (BHS)	Shoot the color viewer to fill the screen. Turn RV307, RV309 alternately to make the waveform flat.  Turn RV311, RV313 alternately to make the waveform flat.
12	Y set-up	RV206 (Y SET) Adjusts set-up of the luminance signal. • Picture seems whitish or depressed.	Video PC Board TP22	RV206 (Y SET)	Fit the lens cap to shut off the incident light. Set the waveform to 50mVp-p ± 10mV. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
13	R set-up	RV208 (R SET) Adjusts R signal set-up. • Picture becomes reddish or cyan.	Video PC Board TP13	RV208 (R SET)	Fit the lens cap to shut off the incident light: Set the waveform to 0.17Vp-p ± 0.05V. 
14	White balance adjustment	RV209 (B SET) Adjusts B signal set-up. • Picture becomes blue or yellow. RV212 (RGN) Adjusts R signal gain. Match levels with Y_L and B signals to adjust so that white balance is obtained. • White balance is not obtained. RV214 (BGN) Adjusts B signal gain. Match levels with Y_L and R signals to adjust so that white balance is obtained. • White balance is not obtained. RV207 (Y_L SET) Adjust Y_L signal (green) set-up • Picture becomes green or magenta	Video PC Board TP22	RV212 (RGN), RV214 (BGN), RV207 (Y_L SET), RV209 (B SET)	Shoot the grey scale chart to fill the screen. Turn RV212 and RV214 alternately: To minimize 6th ~ 9th waveform carriers. Turn RV207, RV209 alternately: To minimize 2nd ~ 6th waveform carriers. 
15	Black balance adjustment	RV210 (Y_L BB) Match levels of the dark section of Y_L (green) signal with R, B signals. • Picture becomes green or magenta.	Video PC Board TP22	RV210 (Y_L BB)	Fit the lens cap to shut off the incident light: To minimize carrier. 

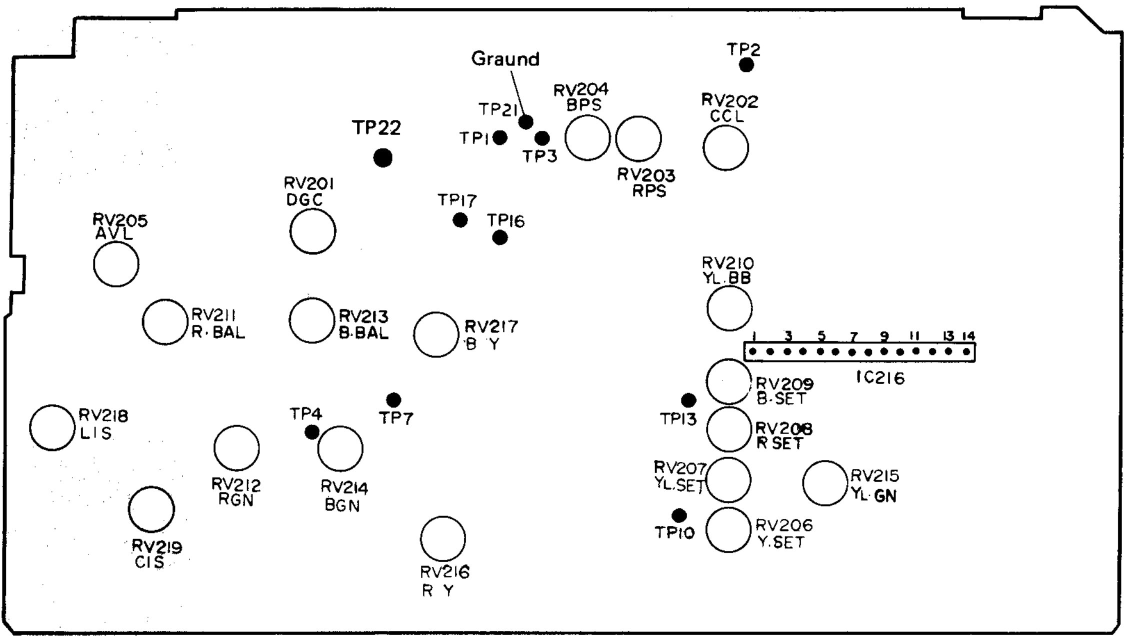

Graund
TP2
TP21
RV204
BPS
RV202
CCL
TP22
TP1
TP3
RV203
RPS
RV201
DGC
TP17
RV205
AVL
TP16
RV210
YL.BB
RV211
R·BAL
RV213
B·BAL
RV217
B Y
1 3 5 7 9 11 13 14
IC216
RV209
B·SET
TP4
TP7
TP13
RV218
LIS
RV208
R SET
RV207
YL.SET
RV215
YL·GN
RV212
RGN
RV214
BGN
TP10
RV206
Y.SET
RV219
CIS
RV216
R Y

Fig. 19 Video PC Board (Parts side)

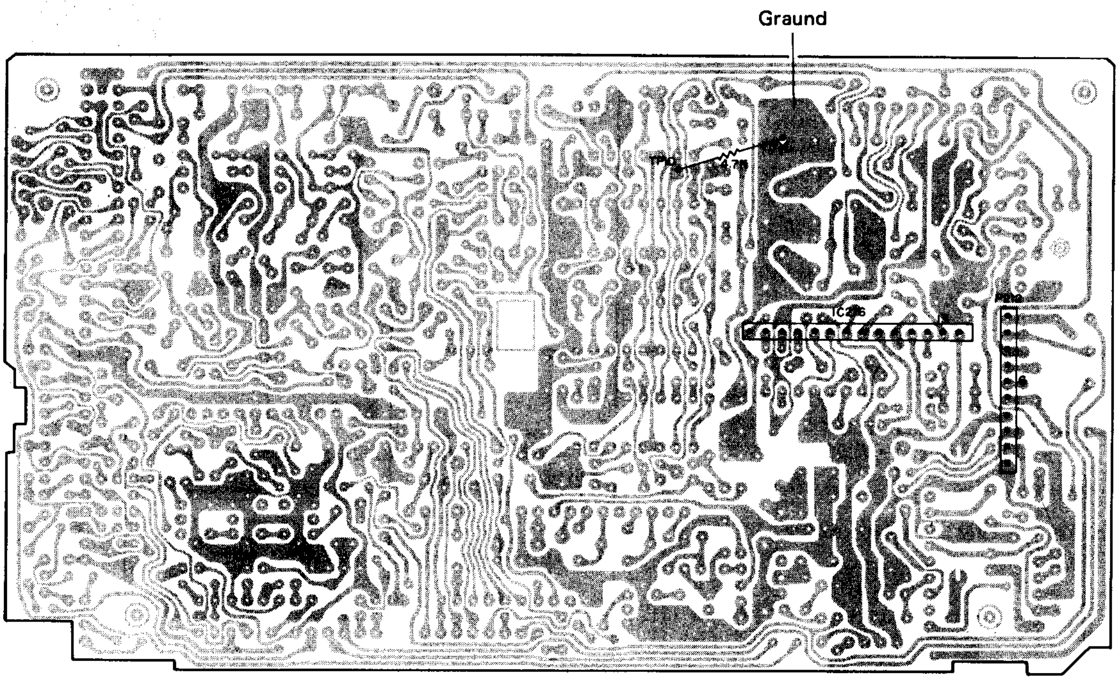

Graund
IC216

Fig. 20 Video PC Board (Pattern side)

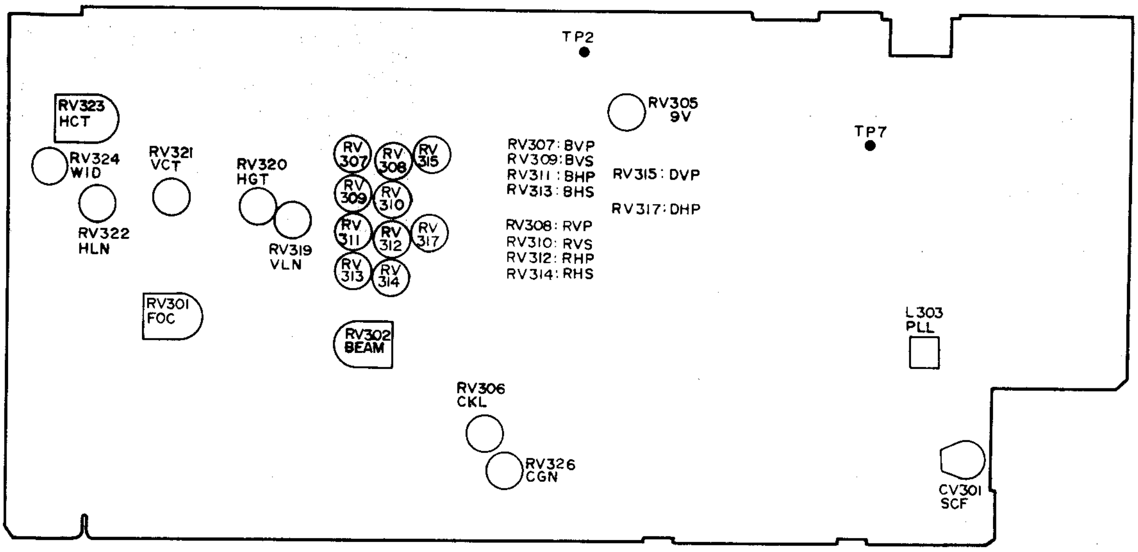

TP2
RV305
9V
TP7
RV323
HCT
RV324
WID
RV321
VCT
RV320
HGT
RV322
HLN
RV319
VLN
RV
307
RV
308
RV
315
RV
309
RV
310
RV
311
RV
312
RV
317
RV
313
RV
314
RV307: BVP
RV309: BVS
RV311 : BHP
RV313: BHS
RV308: RVP
RV310: RVS
RV312: RHP
RV314: RHS
RV315: DVP
RV317: DHP
RV301
FOC
RV302
BEAM
L303
PLL
RV306
CKL
RV326
CGN
CV301
SCF

Fig. 21 Sync PC Board (Parts side)

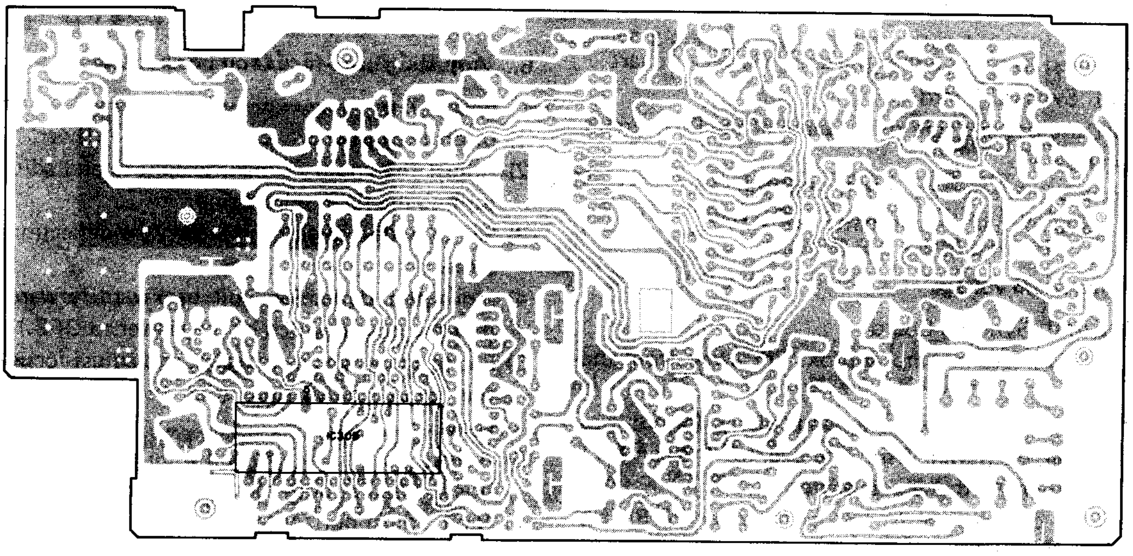


Fig. 22 Sync PC Board (Pattern side)

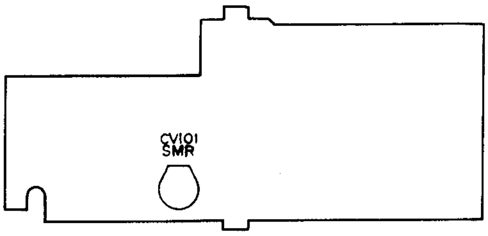


Fig. 23 Pre-PC Board (Parts side)

Circuit adjustment

1. Adjusting power voltage

It is not required to shoot either color viewer or chart.
RV305 (+9V): Sync PC Board.

1) Connect a DC voltmeter to TP2 on the Sync PC Board.
2) Adjust RV305 so that the reading of the voltmeter is 9V.

2. Adjusting sub-carrier frequency

It is not required to shoot either the color viewer or chart.
CV301 (SCF): Sync PC Board.

1) Connect a frequency counter to TP7 on the Sync PC Board.
2) Adjust CV301 so that the reading of the counter is 3.579545MHz ± 50Hz. (for UK-C800 (U·C))
   4.433619MHz ± 50Hz: for UK-C800E)

3. Adjusting PLL

Perform this adjustment when parts IC305, X301, C320, C321, C323, L303 are replaced. Adjustment is not required in other cases.
It is not required to shoot either the color viewer or chart.
L303 (PLL): Sync PC Board

1. Unsolder the pattern side shield plate of the PLL circuit on Sync PCB.
2. Connect a DC voltmeter to pin 5 of IC305.
3. Adjust L303 so that the voltmeter reads 3V.

4. Adjusting beam voltage

RV302 (BEAM): Sync PC Board

1) Place the fluorescent lamp approx. 2m away from the lens surface.
2) Shoot the fluorescent lamp perpendicularly. (Shoot it as shown in Fig. 24 viewed from the back of the camera.)
3) Adjust the zoom to the widest angle.
4) Connect the oscilloscope to TP1 of the video PC Board.
5) Adjust RV302 so that the level of the waveform is 0.75Vp-p ± 0.05V.

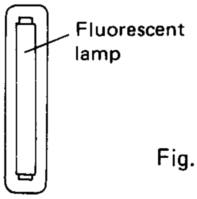


Fig. 24

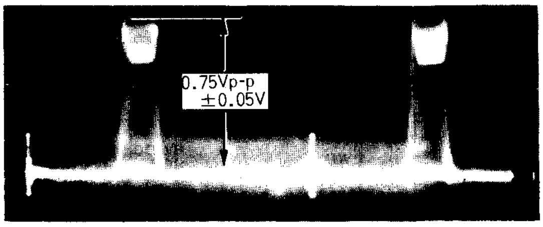


Fig. 25

5. Adjusting field focus

RV301 (FOC), Sync PC Board

1) Shoot the color viewer without the chart attached to it.
2) Adjust the zoom so that the ends of the color viewer are in contact with the edges of the TV screen.
3) Connect the oscilloscope to TP2 of the video PC Board.
4) Adjust RV301 so that the waveform is flat or the ratio of the max. amplitude and min. amplitude is 2:1 during the video period of the waveform.

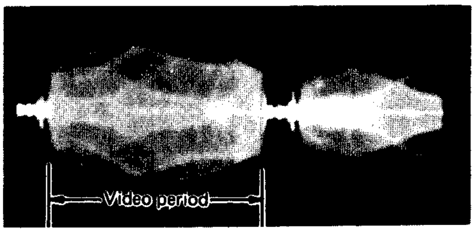


Fig. 26

6. Adjusting back-focus and horizontal

- Back-focus

1) Insert the test chart A into the color viewer.
2) Adjust the zoom to max. telephoto and adjust focus by turning the focus adjust ring.
3) Set to widest angle, and loosen the deflection coil fixing screw.
4) Move the deflection coil backward/forward to focus. (Set the power switch of the viewer to OFF.)
5) Set to max. telephoto again, and adjust focus by turning the focus adjust ring. (Set the power switch of the viewer to ON.)
6) Adjust max. telephoto and wide angle repeatedly so that it is focused at both telephoto and wide angle.
7) Next, adjust horizontal

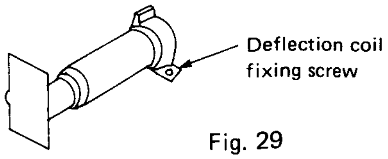


Fig. 29

- Horizontal

1) Check horizontal of the camera and chart.
   (Check horizontal of the camera placed on the repair bench or the tripod, and the chart placed on the repair bench visually.)
2) Turn the deflection coil to adjust so that the chart on the TV screen is horizontal.
   (It is acceptable to adjust the zoom so that the edges of the chart on the TV screen do not exceed the TV picture, or turn the vertical hold control of the TV set to the horizontal blanking period appears on the screen, and match the chart and the horizontal blanking period so they are parallel. Return the vertical hold control after adjustment.)
3) Check the back-focus. Adjust when there is drift.
   (Check that it is focused at max. telephoto and wide angle. Be sure to check horizontal when back-focus is adjusted.)
4) Tighten the deflection coil fixing screw.

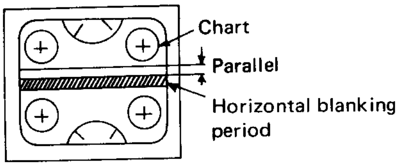


Fig. 30

7. Adjusting vertical position

RV321 (VCT): Sync PC Board

1) Either use the chart or not.
2) Adjust the vertical hold control of the TV set so the horizontal blanking period appears on the screen.
3) Adjust RV321 so that the optical black mask overlaps the horizontal blanking period.
4) Return the vertical hold control of the TV set.

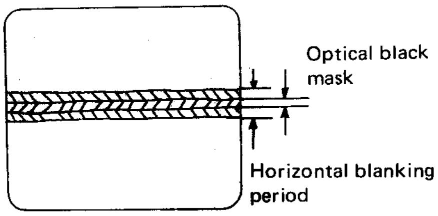


Fig. 31

8. Adjusting horizontal size

RV323 (HCT), 324 (WID): Sync PC Board

1) Shoot the color viewer without inserting the chart.
2) Adjust TV screen.
3) Connect the oscilloscope to TP22 of the video PC Board.
4) Turn RV324 counterclockwise to make the width of the picture narrower.
5) Adjust the position using RV323, and the width using RV324 so that the waveform shown in Fig. 32 is obtained.
   This is the waveform with a little of the optical black mask remaining at both ends of the video period.

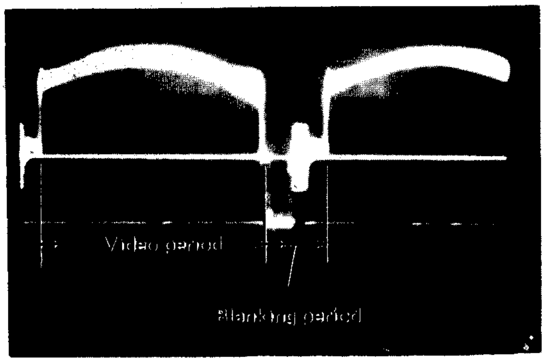


Fig. 32

9. Adjusting vertical size, linearity

RV320 (HGT), RV322 (HLN), RV319 (VLN): Sync PC Board

1) Insert chart A into the color viewer and bring it into focus.
2) Adjust the zoom so that the chart A fills the TV screen.
3) Adjust height using RV320, vertical linearity, by RV322 and horizontal linearity by RV319 so that the circle in the chart on the screen is round.

10. Adjusting dynamic focus

RV315 (DVP) RV317 (DHP): Sync PC Board.

1) Shoot the color viewer without inserting the chart and bring it in focus.
2) Adjust the zoom so that the viewer is projected to fill the TV screen.
3) Connect an oscilloscope to G4 on the filter PC Board.
4) Adjust RV315 so that the waveform level is 1Vp-p ± 0.5V.

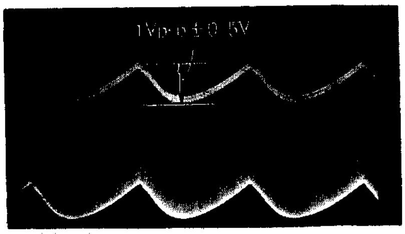


Fig. 33

5) Adjust RV317 so that the waveform level is 4Vp-p ± 0.5V.

11. Confirmation of beam voltage adjustment

RV302 (BEAM): Sync PC Board

1) Place the fluorescent lamp approx. 2m away from the lens surface.
2) Shoot the fluorescent lamp perpendicularly. (Shoot it as shown in Fig. 34 viewed from the back of the camera.)
3) Adjust the zoom to the widest angle.
4) Connect the oscilloscope to TP1 of the video PC Board.
5) Adjust RV302 so that the level of the waveform is 0.75Vp-p ± 0.05V.

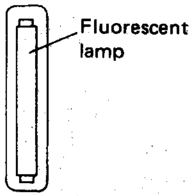


Fig. 34

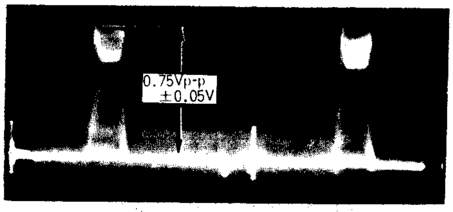


Fig. 35

12. Y set-up

RV206 (Y SET): Video PC Board

1) Fit the lens cap to shut off incident light.
2) Connect the oscilloscope to TP22 of the video PC Board.
3) Adjust RV206 so that the set-up is 50mVp-p ± 10mV.

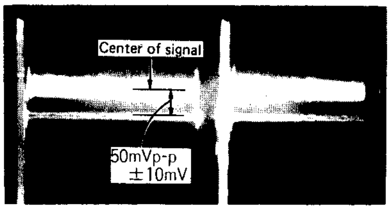


Fig. 36

13. Setting level indicator

RV218 (LIS): Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart is projected to fill the TV screen.
3) Mount the viewfinder on camera.
4) Connect an oscilloscope to TP22 on the video PC Board and adjust RV205 so that the waveform is set to 0.35 Vp-p.
5) Adjust RV218 to the position where indicator "L" inside the viewfinder stops flashing and goes off.

14. Adjusting video level

RV205 (AVL)

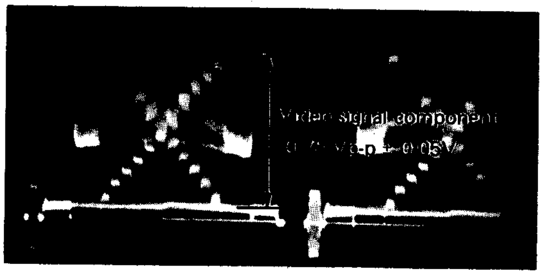


Fig. 37

1) Insert the grey scale chart into the color viewer, shoot it and bring it in focus.
2) Adjust the zoom so that the grey scale chart is projected and fills the TV screen.
3) Connect an oscilloscope to TP22 on the video PC Board.
4) Adjust RV205 so that the video signal component of the waveform is 0.75Vp-p ± 0.05V.

15. Confirmation of field focus adjustment

RV301 (FOC), Sync PC Board

1) Shoot the color viewer without the chart attached to it.
2) Adjust the zoom so that the end of the color viewer is in contact with the TV screen.
3) Connect the oscilloscope to TP2 of the video PC Board.
4) Adjust RV301 so that the waveform is flat or the ratio of the max. amplitude and min. amplitude is 2:1 during the video period of the waveform.

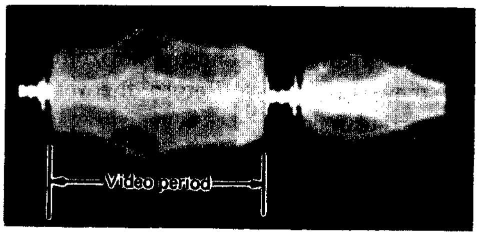


Fig. 38

16. Adjusting chroma carrier level

RV202 (CCL): Video PC Board

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect the oscilloscope to TP3 of video PV Board.
4) Adjust RV202 to set it to 50mVp-p ± 5mV.

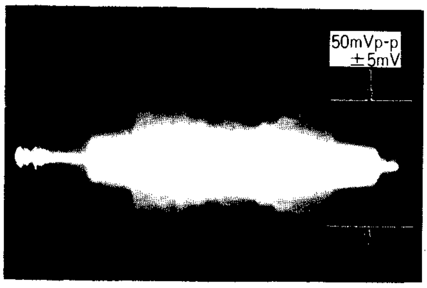


Fig. 41

17. Adjusting red phase, balance

RV203 (RPS), RV211 (R BAL): Video PC Board

1) Insert the color bar chart into the color viewer and bring it into focus.
2) Adjust the zoom so that the color bar chart fills the TV screen.
3) Connect the oscilloscope to TP4 of the video PC Board.
4) Repeatedly turn RV203 and RV211 to minimize the blue level of the waveform.

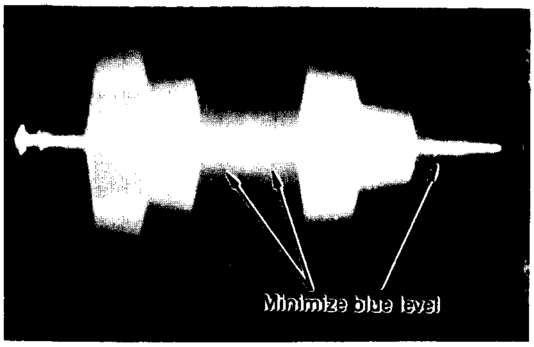


Fig. 42

18. Adjusting blue phase, balance

RV204 (BPS), RV213 (B BAL): Video PC Board

1) Insert the color bar chart into the color viewer and bring it into focus.
2) Adjust the zoom so that the color bar chart fills the TV screen.
3) Connect the oscilloscope to TP7 of the video PC Board.
4) Repeatedly turn RV204 and RV213 to minimize the red level of the waveform.

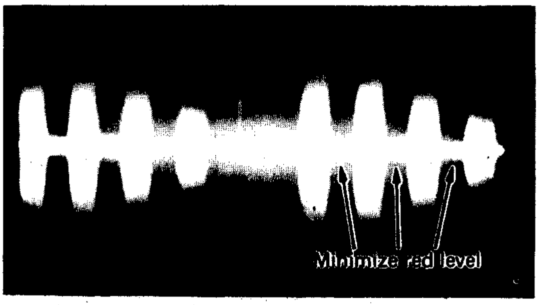


Fig. 43

19. R set-up

RV208 (R SET): Video PC Board

1) Fit the lens cap to shut off incident light.
2) Connect the oscilloscope to TP13 of the video PC Board.
3) Adjust RV208 so that the waveform (pedestal level) is 0.17Vp-p ± 0.05Vp-p.

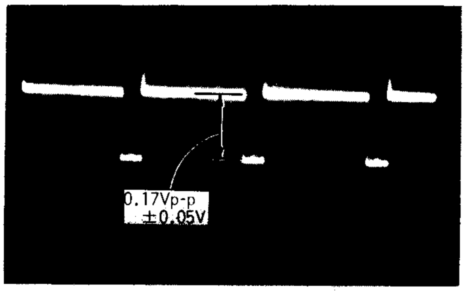


Fig. 44

20. Adjusting Y_L gain

RV215, RV215 (Y_LGN): Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it in focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect an oscilloscope to IC216 pin 13 on the video PC Board.
4) Adjust RV215 so that the waveform is minimum.

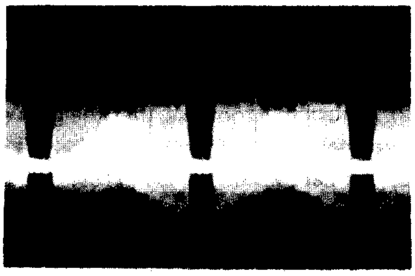


Fig. 45

21. Adjusting color difference balance

RV216 (R – Y), RV217 (B – Y): Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Insert a 4.7kΩ resistor between TP10 on the video PC Board and the GND pattern to clip the white level. (Install the resistor after switching off the power).
4) Connect an oscilloscope to TP22 on the video PC Board.
5) Adjust RV216, RV217 to minimize the carrier at the clipped section.
6) Remove the 4.7kΩ resistor after adjustment.

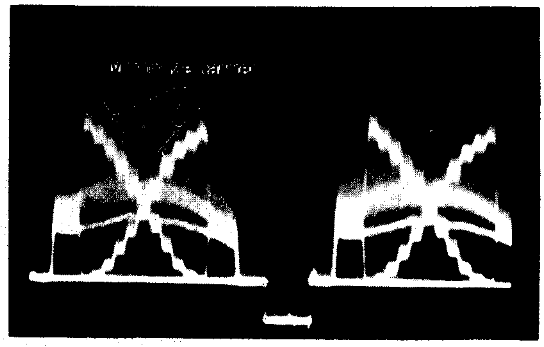


Fig. 46

22. Adjusting chroma gain

RV325 (CGN): Sync PC Board.

1) Fit the lens cap to shut off the incident light.
2) Connect an oscilloscope to TP22 on the video PC Board.
3) Adjust RV325 so that the burst signal is 0.3Vp-p ± 0.05V.

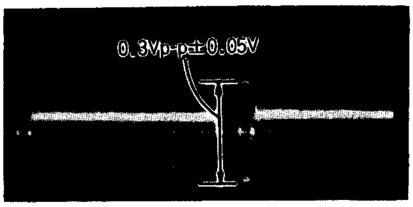


Fig. 47

23. Adjusting white balance

RV212 (RGN), RV214 (BGN), RV217 (Y_LSET), RV209 (B SET). Video PC Board

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect an oscilloscope to TP22 on the video PC Board.
4) Alternately adjust RV212, RV214 to minimize the 6th ~ 9th signals from the bottom of the waveform.
5) Adjust RV207, RV209 alternately to minimize the 2nd ~ 6th signals from the bottom of the waveform.

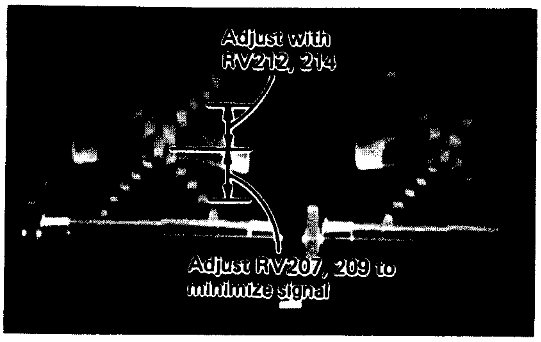


Fig. 48

24. Adjusting black balance

RV210 (Y_L BB): Video PC Board.

1) Fit the lens cap to shut off the incident light.
2) Connect the oscilloscope to TP22 of the video PC Board.
3) Adjust RV210 so that the carrier of the waveform is minimum.

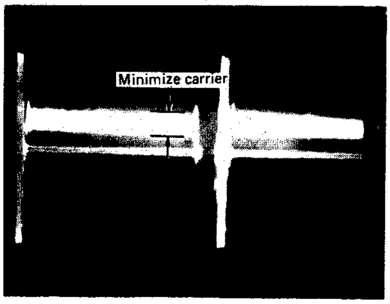


Fig. 49

25. Adjusting smear

CV101 (SMR). Pre-PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it in focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Adjust so that the color smears on the right of the grey scale white section do not occur.

Note: Adjust only when the color smears occur.
Re-adjust white balance and black balance after adjusting smear.

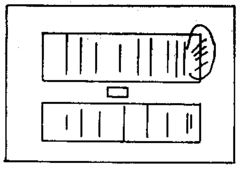


Fig. 50

26. Re-adjusting white balance, black balance

- White balance

RV212 (RGN), RV214 (BGN), RV207 (Y_L SET), RV209 (B SET). Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect the oscilloscope to TP22 of the video PC Board.
4) Repeatedly turn RV212 and RV214 to minimize the signal at 6th ~ 9th waveforms from the bottom.
5) Repeat the adjustment of RV207, RV209 alternately to minimize the signal at 2nd ~ 6th waveforms from the bottom.

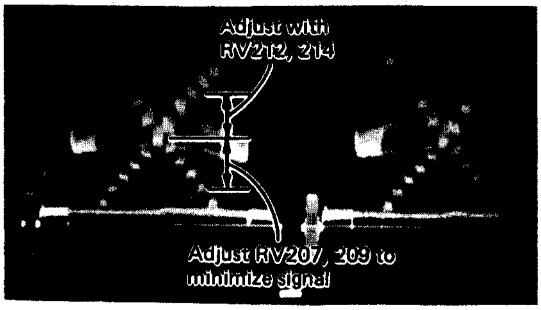


Fig. 51

- Black balance

RV210 (Y_L BB): Video PC Board.

1) Fit the lens cap to shut off the incident light.
2) Connect the oscilloscope to TP22 of the video PC Board.

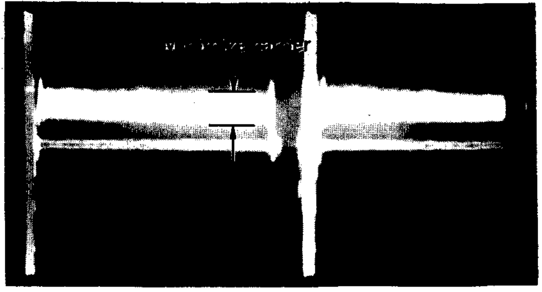


Fig. 52

3) Adjust RV210 so that the carrier of the waveform is minimum.

27. Adjusting red/modulation shading

RV308 (RVP), RV310 (RVS), RV312 (RHP), RV314 (RHS): Sync PC Board

1) Shoot the color viewer without inserting a chart.
2) Adjust the zoom so that the viewer fills the TV screen.
3) Connect the oscilloscope to TP16 of the video PC Board.
4) Repeatedly turn RV308 and RV310 so that the vertical (V) period is flat.
5) Repeatedly turn RV312 and RV314 so that the horizontal (H) period as flat as possible.

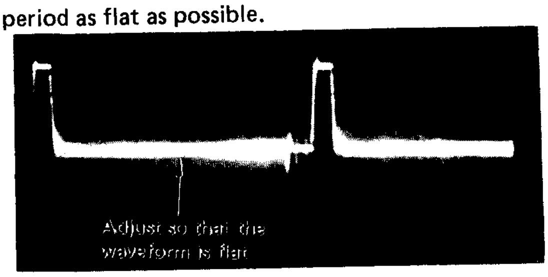


Fig. 53

28. Adjusting blue/modulation shading

RV307 (BVP), RV309 (BVS), RV311 (BHP), RV313 (BHS): Sync PC Board

1) Adjust in the way same as the red/modulation shading adjustment in item 27). Connect the oscilloscope to TP17 of the video PC Board, and adjust the V period using RV307, RV309, and H period using RV311, RV313.

29. Re-adjusting white balance

RV212 (RGN), RV214 (BGN), RV207 (Y_L SET), RV209 (B SET). Video PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it into focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Connect the oscilloscope to TP22 of the video PC Board.
4) Repeatedly turn RV212 and RV214 to minimize the signal at 6th ~ 9th waveforms from the bottom.
5) Repeat the adjustment of RV207, RV209 alternately to minimize the signal at 2nd ~ 6th waveforms from the bottom.

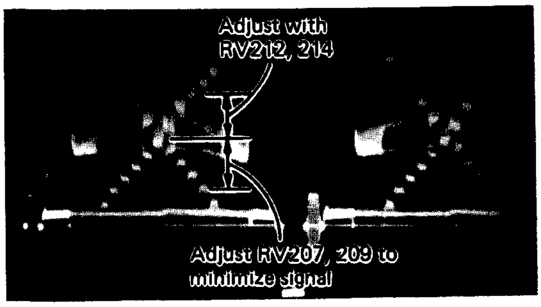


Fig. 54

30. Adjusting chroma killer level

RV306 (CKL): Sync PC Board.

1) Insert the grey scale chart into the color viewer, shoot it and bring it in focus.
2) Adjust the zoom so that the grey scale chart fills the TV screen.
3) Set the INDOOR/OUTDOOR select switch to "OUTDOOR" to set the TV picture so it is reddish.
4) Connect an oscilloscope to TP22 on the video PC Board.
5) Adjust RV306 so that the 11th (white peak section) carrier of the waveform is 100mVp-p ± 10mV.
6) Set the INDOOR/OUTDOOR select switch to "INDOOR" after adjustment.

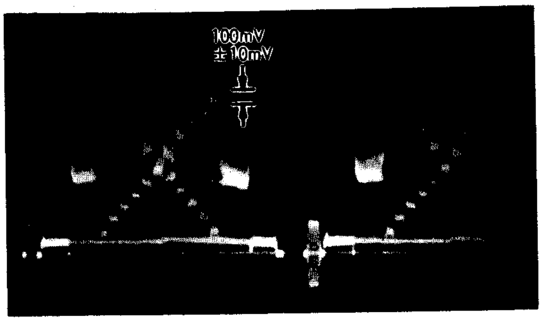


Fig. 55

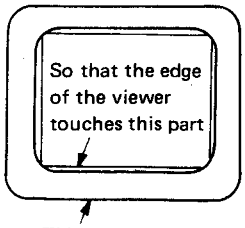
31. White balance indicator setting

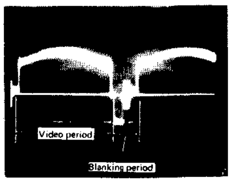
RV219 (CIS): Video PC Board.

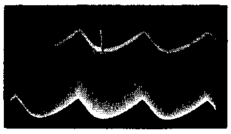
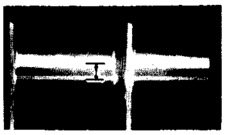
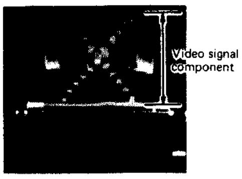
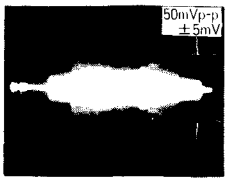
1) Shoot the color viewer without inserting a chart and bring it in focus.
2) Adjust the zoom so that the viewer fills the TV screen.
3) Set the white balance check switch to "CHECK".
4) Adjust RV219 so that the indicator "W" in the viewfinder goes off.

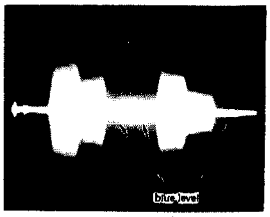
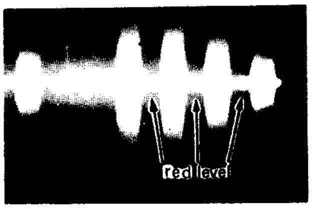
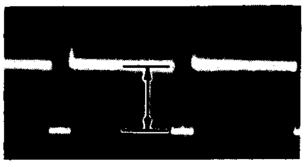
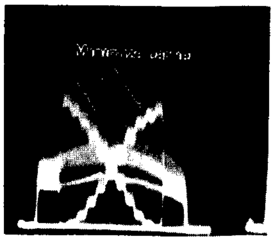
Circuit adjustment list

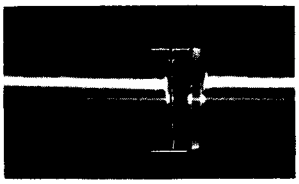
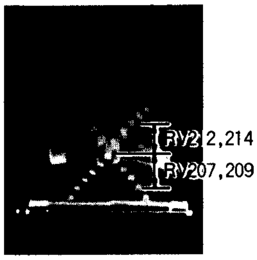
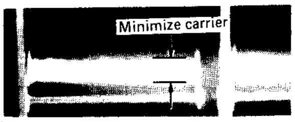
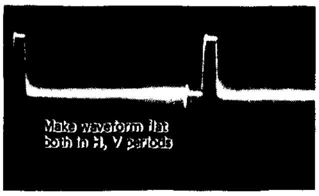
Note: Items concerning the purpose of adjustment and phenomenon of picture in the table are shown in the order:
Circuit No., Purpose of adjustment & phenomenon of picture

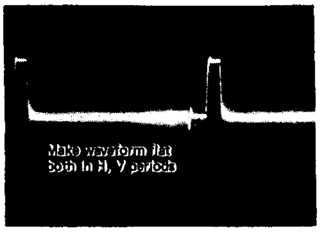
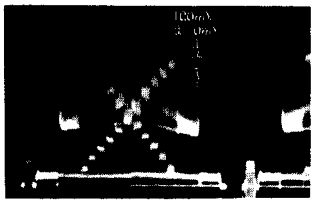
Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
1	Adjusting power voltage	RV305 (+9V) Setting camera circuit power voltage	TP2	RV305 (+9V)	Reading of voltmeter: 9V
2	Adjusting sub-carrier frequency	CV301 (SCF) Adjusts frequency of the sync signal generator. • Color flickers, no color or color is incorrect	TP7	CV301 (SCF)	Reading of counter: 3.579545MHz ± 50Hz: for VK-C800 (U·C) 4.433619MHz ± 50Hz: for VK-C800E
3	Adjusting PLL Adjust when IC305, X301, C320, C321, C323, L303 are replaced.	L303 (PLL) Adjusts to provided inter-leaving of the horizontal sync signal and the sub-carrier frequency. • Picture unstable, sync incorrect or no color.	IC305 (pin 5)	L303 (PLL)	Reading of voltmeter: 3V
4	Adjusting Beam voltage	RV302 (BEAM) Adjust the electron beam of SATICON while varying the G1 voltage. • When voltage is low, steps in the high luminance section (white) of the grey scale cannot be distinguished. • When voltage is high, magenta ghost appears to the right of the high luminance section of the grey scale. Or, the section becomes green (horizontally). Shading increases.	Video PC Board TP1	RV302 (BEAM)	Shoot fluorescent lamp 2m away at right angles. Set the waveform to 0.75Vp-p ± 0.05V
5	Field focus adjustment	RV301 (FOC) Set the focus electrode voltage of SATICON and adjust so that the electron beam from the cathode focuses on the photoconductive film. • It is badly focused when the focus ring is turned or the back-focus is adjusted using the coil ass'y.	Video PC Board TP2	RV301 (FOC)	Shoot the color viewer to fill the TV screen  Set the waveform so it is flat; when not possible, set so that the ratio of the max, amplitude and min. amplitude is 2:1.

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
6	Back-focus, horizontal adjustment • Back-focus		TV picture	Deflection coil	Shoot test chart A. 1. Set the viewer power supply to ON. Adjust zoom to telephoto and focus. Loosen the deflection coil fixing screw. 2. Set the viewer power supply OFF. Adjust zoom to MAX. WIDE and move deflection coil backward. Adjust so that both max. telephoto and max. wide angle are in focus.
	• Horizontal		TV picture	Deflection coil	Let the horizontal blanking period of the TV appear on the screen. Turn the deflection coil so that the chart edge and the blanking are parallel. Check the back-focus after adjustment
7	Vertical position adjustment	RV321 (VCT) Vertical deflection position adjustment • Black mask appears at the top of the picture or, the transparent mask appears to the bottom of the picture.	TV picture	RV321 (VCT)	Let the horizontal blanking of the TV appear on the screen. Overlap the optical black mask and blanking period.
8	Horizontal size adjustment	RV324 (WID) Horizontal deflection size adjustment • The circle chart looks crushed. Color balance is not correct and becomes green. RV323 (HCT) Horizontal deflection position adjustment • Black mask appears to the left or WIDE and move deflection coil backward and forward.	TV picture Video PC Board TP22	RV324 (WID) RV323 (HCT)	Shoot the color viewer to fill the screen. Turn RV324 counter-clockwise: To shorten the waveform width Turn RV323, RV324: To set black mask to approx. 1μsec on both left/right sides. 
9	Vertical size/ linearity adjustment	RV319 (VLN) Adjusts vertical deflection linearity • Circular chart is distorted. RV320 (HGT) Adjust vertical deflection size • Circular chart is distorted RV322 (HLN) Adjusts horizontal deflection linearity • Circular chart is distorted. Color unevenness appears on left and right.	TV picture	RV320 (HGT) RV322 (HLN) RV319 (VLN)	Shoot the test chart A to fill the screen. Alternately turn RV320, RV322, RV319 to make the chart circular.

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
10	Adjusting dynamic focus	RV315 (OVP) RV317 (DHP) Correct focus of peripheral beams of SACTION. Adjust dynamic focus • Black lines in the picture. Big color uneveness.	Filter PC Board pin G_4	V period: RV315 (DVP) H period: RV317 (DHP)	Shoot the color viewer to fill the screen Turn RV315 so that the waveform level is 1Vp-p ± 0.5V  Turn RV317 so that the waveform level is 4Vp-p ± 0.5V
11	Confirmation of beam voltage adjustment				
12	Y set-up	RV206 (Y SET) Adjusts set-up of the luminance signal. • Picture seems whitish or depressed.	Video PC Board TP22	RV206 (Y SET)	Fit the lens cap to shut off the incident light. Set the waveform to 50mVp-p ± 10mV. 
13	Level indicator set	RV218 (LIS) Adjusts the point where the "L" lamp which shows low light lights. • "L" lamp does not light when the picture level is lowered, or always keeps lighting.	 Video PC Board TP22 Viewfinder "L" indicator	 RV205 (AVL) RV218 (LIS)	Shoot the grey scale chart to fill the screen. Mount the viewfinder on the camera. Set the video signal component of the waveform to 0.35Vp-p. Turn RV218 so "L" indicator changes from flashing to off.
14	Adjusting video level	RV205 (AVL) Sets the balance of the lens autoiris mechanism to keep the video output level constant. • Picture is dark when illumination is sufficient. Picture is too bright and bright sections are saturated.	Video PC Board TP22	RV205 (AVL)	Shoot the grey scale chart to fill the screen. Adjust the video signal component level to 0.75Vp-p ± 0.05V. 
15	Confirmation of field focus adjustment				
16	Chroma carrier level adjustment	RV202 (CCL) Adjust chroma signal carrier level. • No color, tint abnormal	Video PC Board TP3	RV202 (CCL)	Shoot the grey scale to fill the screen Adjust the waveform level: Set to 50mVp-p ± 5mV. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
17	Red phase/balance adjustment	RV203 (RPS) Adjusts the phase shift angle for R separation in the R/B chroma separation circuit. • Color reproduction is not satisfactory and mixed color seen. RV211 (R. BAL) Adjusts the 1H delayed chroma signal carrier level to match it to the chroma signal carrier level of the output of the phase shifter. • Color saturation and purity are deteriorated and mixed color occurs.	Video PC Board TP4	RV203 (RPS) RV211 (R. BAL)	Shoot the color bar chart to fill the screen. Alternately turn RV203 and RV211 to minimize blue level. 
18	Blue phase/balance adjustment	RV204 (BPS) Adjusts the carrier phase angle for separating B in the R/B color separation circuit. • Color reproduction is not satisfactory and mixed color occurs. RV213 (B BAL) Adjusts carrier level to match it to the color signal carrier level of the phase shifter output output. • Color satuation and purity are deteriorated and mixed color occurs.	Video PC Board TP7	RV204 (BPS) RV213 (B. BAL)	Short the color bar chart to fill the screen. Alternately turn RV204, RV213 to minimize the red level. 
19	R set-up	RV208 (R SET) Adjusts R signal set-up. • Picture becomes reddish or cyan.	Video PC Board TP13	RV208 (R SET)	Fit the lens cap to shut off the incident light: Set the waveform to 0.17Vp-p ± 0.05V. 
20	Adjusting Y_L gain	RV215 (Y_L GN) Adjusts Y_L (green) signal gain. Changes the 1H delayed Y_L signal level so that it is different from the level of the normal Y_L signal. • White balance cannot be obtained. Unnatural color.	Video PB Board IC216 pin 13	RV215 (Y_L GN)	Shoot the grey scale chart to fill the screen. Adjust the waveform level to minimum.
21	Adjusting color difference balance	RV216 (R – Y) Adjusts balance of color difference signal R – Y • Color reproduction faulty RV217 (B – Y) Adjusting balance of color difference signal B – Y • Color reproduction faulty	Video PC Board TP22	RV216(R–Y) RV217(B–Y)	Shoot the grey scale chart to fill the screen. Connect a 4.7kΩ resistor between video PC Board TP10 and GND. Turn RV216 and RV217 to minimize the carrier at the waveform clipping section. 

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
22	Adjusting chroma gain	RV215 (CGN) Chroma signal gain • Color is too dense. Color beats. Color unevenness conspicuous.	Video PC Board TP22	RV325 (CGN)	Fit the lens cap to shut off the incident light. Adjust the burst level to 0.3Vp-p ± 0.05V. 
23	Adjusting white balance	RV209 (B SET) Adjusts set-up B signal. • Picture becomes blue or yellow. RV212 (G GN) Adjusting R signal gain. Matches levels with Y_L, B signal and adjusts so that the white balance is obtained. • White balance cannot be obtained. RV214 (B_L GN) Adjusting B signal gain. Match levels with Y_L, R signal and adjust so that the white balance is obtained. • White balance cannot be obtained RV207 (Y_L, SET) Adjusts set-up of Y_L, G (green) signals. • Picture becomes green or magenta.	Video PC Board TP22	RV212 (RGN) RV214 (BGN) RV207 (Y_L SET) RV209 (B SET)	Shoot the grey scale chart to fill the screen. Turn RV212, RV214 alternately: Minimize carrier of 6th~9th waveforms. Turn RV207, RV209 alternately: Minimize carrier of 2nd~6th waveforms. 
24	**Black balance adjustment**	RV210 (Y_L BB) Match levels of the dark section of Y_L (green) signal with R, B signals. • Picture becomes green or magenta.	Video PC Board TP22	RV210 (Y_L BB)	Fit the lens cap to shut off the incident light: To minimize carrier. 
25	Adjustment smear	CV101 (SMR) Corrects pre-amp frequency response • Color smears occur at outlines on the screen.	TV screen	Pre-amp PC Board CV101 (SMR)	Shoot the grey scale chart to fill the screen. Adjust so that color smears on the right of the chart white section do not occur.
26	Re-adjusting white balance, black balance				
27.	Red/modulation shading adjustment	RV308 (RVP), RV310 (RVS), RV312 (RHP), RV314 (RHS) Correct color unevenness of R signal. • Color unevenness is too great.	Video PC Board TP16	V period: RV308 (RVP), RV310 (RVS)	Shoot the color viewer to fill the screen. Turn R308, R310 alternately to make the waveform flat. 
				H period: RV312 (RHP), RV314 (RHS)	Turn RV312, RV314 alternately to make the waveform flat.

Item No.	Name of adjustment	Purpose of adjustment & phenomenon of picture	Test point	Adjusted part	Adjustment
28	Blue/modulation shading adjustment	RV367 (BVP), RV309 (BVS), RV311 (BHP), RV313 (BHS) Correct color unevenness of B signal. • Color unevenness too great	Video PC Board TP17	V period: RV307 (BVP) RV309 (BCS) H period: RV311 (BHP) RV313 (BHS)	Shoot the color viewer to fill the screen. Turn RV307, RV309 alternately to make the waveform flat.  Turn RV311, RV313 alternately to make the waveform flat.
29	Readjusting white balance				
30	Adjusting chroma killer level	RV306 (CKL) Changes the control voltage so that high luminance sections are not colored and sets it so that no color appears in sections with level higher than that. • When setting is too high, green appears in white sections. • When setting is too low, yellow color is not seen in yellow sections when the color bar is shot. No color is seen in comparatively bright sections.	Video PC Board TP22	RV306(CKL)	Shoot the grey scale chart to fill the screen. Set the INDOOR/OUTDOOR select switch to "OUTDOOR". Adjust the carrier of the 11th step waveform to 100mVp-p ±10mV. 
31	White balance indicator set	RV219 (CIS) Adjusts so that the white balance indicator "W" goes off when white balance is obtained. • The indicator does not go off when white balance is obtained.	Viewfinder "W" indicator.	RV219(CIS)	Check adjustment of white balance. Shoot the color viewer to fill the screen. Set the white balance check switch to "CHECK". Mount the viewfinder on the camera. Turn RV219: So the "W" indicator goes off.

Viewfinder adjustment

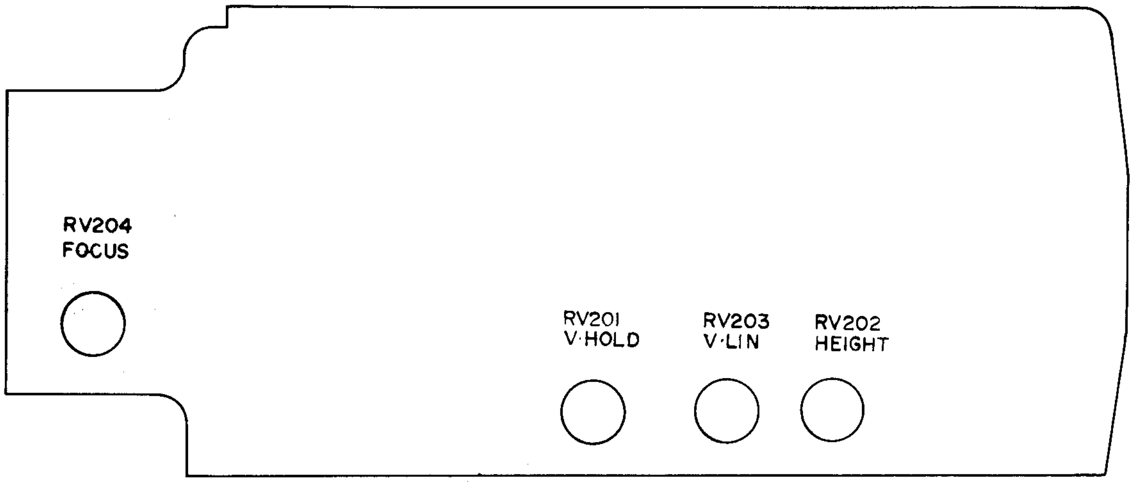


Fig. 56 Viewfinder PC Board (Parts side)

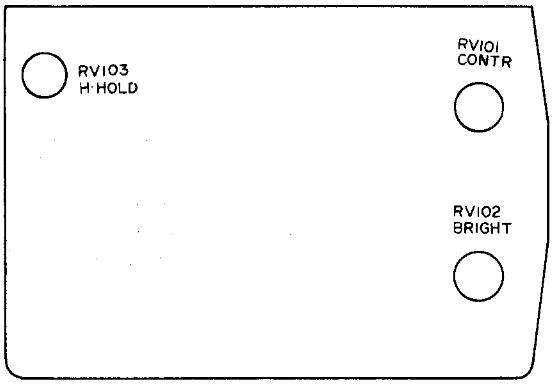


Fig. 57 Viewfinder PC Board (Pattern side)

Perform adjustment while looking through the viewfinder.

1. Adjusting contrast
   RV101 (CONTR) : Adjust the contrast of picture so that the picture is easy to see.
2. Adjusting brightness
   RV102 (BRIGHT) : Adjusts brightness of the picture so that the picture is easy to see.
3. Adjusting vertical hold
   RV201 (V. HOLD): Adjusts vertical hold.
4. Adjusting vertical height
   RV202 (HIGHT) : Adjusts vertical height
5. Adjusting vertical linearity
   RV203 (V. LIN) : Adjusts vertical linearity.
6. Adjusting horizontal hold
   RV103 (H. HOLD): Adjusts horizontal hold
7. Adjusting focus
   RV204 (FOCUS) : Adjusts so that focus of the picture is best.
8. Adjusting centering
   Matches the raster position using the centering magnets attached to the deflection yoke.